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Master hard-surface modelling Page 24

“You can ZRemesh at a low polycount for potential future detail with ZModeler”

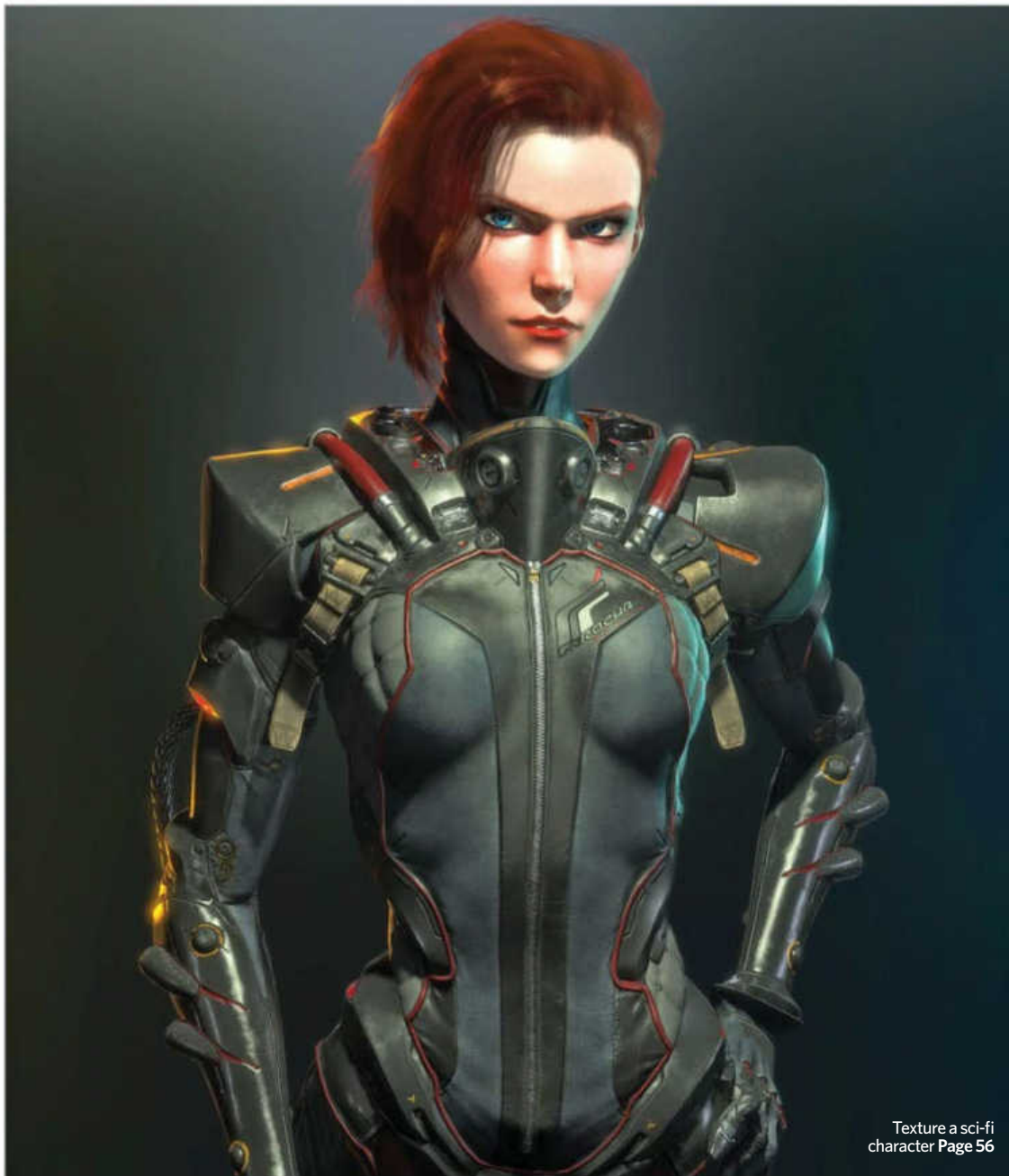
Juan Hernández on how he uses ZBrush to create panels **Page 29**



Juan Hernández
armoredwolf.artstation.com

Software ZBrush, Maya, Photoshop, KeyShot





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3DArtist

Imagine Publishing Ltd
Richmond House, 33 Richmond Hill
Bournemouth, Dorset BH2 6EZ
☎ +44 (0) 1202 586200
Web: www.imagine-publishing.co.uk
www.3dartistonline.com
www.greatdigitalmags.com

Magazine team

Editor Steve Holmes

stephen.holmes@imagine-publishing.co.uk
☎ 01202 586248

Features Editor Carrie Mok

Art Editor Newton Ribeiro de Oliveira

Editor in Chief Amy Hennessey

Senior Art Editor Will Shum

Photographer James Sheppard

Publishing Director Aaron Asadi

Head of Design Ross Andrews

Contributors

Tom Bramall, James Clarke, Rainer Duda, Philippa Grafton, Ermanno Di Nicola, Daniel Sian, Midge Sinnaeve, Matteo Stella, Sami Tarvainen

Advertising

Digital or printed media packs are available on request.

Head of Sales Hang Deretz ☎ 01202 586442
hang.deretz@imagine-publishing.co.uk

Account Manager Simon Hall ☎ 01202 586415
simon.hall@imagine-publishing.co.uk

FileSilo.co.uk

Assets and resource files for this magazine can be found on this website. Register now to unlock thousands of useful files. Support: filesilohelp@imagine-publishing.co.uk

International

3D Artist is available for licensing. Contact the International department to discuss partnership opportunities.

Head of International Licensing Cathy Blackman

☎ +44 (0) 1202 586401
licensing@imagine-publishing.co.uk

Subscriptions

For all subscription enquiries:
3dartist@servicehelpline.co.uk
☎ UK 0844 249 0472
☎ Overseas +44 (0) 1795 592951
www.imaginesubs.co.uk

Head of Subscriptions Sharon Todd

Circulation

Circulation Director Darren Pearce ☎ 01202 586200

Production

Production Director Jane Hawkins ☎ 01202 586200

Finance

Finance Director Marco Peroni

Founder

Group Managing Director Damian Butt

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Welcome



Technical diversity is key when it comes to modelling. It's critical for you to develop a wide range of skills and techniques so you can perform at full capacity in the studio, and hone your own hard-surface creations at home.

Whether your passions lie in mechs, vehicles, characters or anything in between, we've compiled a stellar roster of modellers from ILM, Ubisoft, Cloud Imperium Games and more to offer up key insight that they've absorbed over long and successful careers. They're a super talented bunch and we're really pleased to have them on board.

The 3D fun doesn't stop there, though. We've also been lucky enough to chat to VFX forefather Phil Tippet and his team at Tippet Studio about the facility's tangible impact on the industry that stretches back to the Eighties. On top of this, we've got all the tools you need to re-create nature in 3D, and our tutorial section is full to the brim with quality guides for Blender, Substance Painter, ZBrush and more.

Finally, in case you hadn't noticed, we're also hurtling inexorably towards issue 100. Be sure to grab your copy on 2 November as we've got some very special features coming your way! Enjoy the magazine and I'll see you next time.

Steve Holmes, Editor

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The Expert Panel

This issue's team of pro artists...



JUAN HERNÁNDEZ

artstation.com/artist/armoredwolf



As soon as we saw Juan's incredible Deep Eyes image, we knew it would make a great cover. Head over to our hard-surface modelling feature on p24 for his valuable insight.

3DArtist username n/a



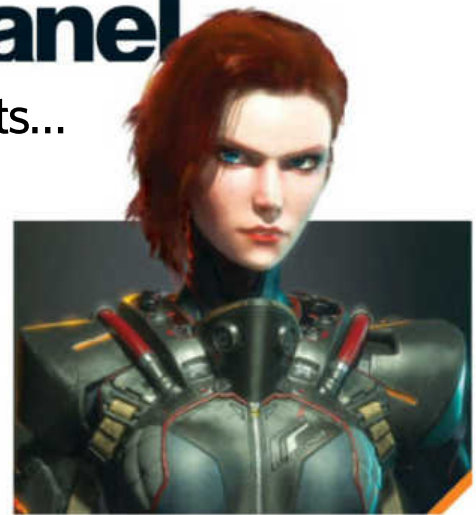
DANIEL SIAN

www.danielsian.com



Daniel makes amazing imagery for advertising from his base in New Zealand, so we asked him to come along and show off his efficient and artistic jellyfish workflow in Cinema 4D. It's on p48.

3DArtist username danielsian



TOM BRAMALL

www.tomb-art.com



Tom, like a lot of other artists at the moment, is a Substance Painter evangelist. He used Allegorithmic's tool to texture his awesome sci-fi pilot character - find out how on p56.

3DArtist username Tomb_Art



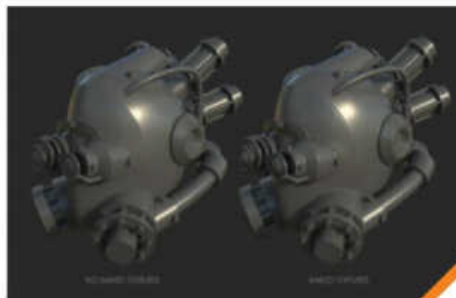
MIDGE SINNAEVE

themantissa.net



It's amazing how little you think about the work that goes into creating dynamic 3D movie titles, despite seeing them all the time. Midge busts out Blender to help you create your own on p64.

3DArtist username Mantissa



SAMI TARVAINEN

samitarvainen.com



Texture baking is a critical process, especially when working with game-res models and well-optimised assets. Learn how to do it properly in Sami's Blender to Substance workflow over on p68.

3DArtist username SamiTarvainen



MATTEO STELLA

starlord.artstation.com



Don't let this month's cover fool you - we're still all about quality organic sculpts as well as hard surfaces. On p72, Matteo shows you how to embellish your creatures with realistic horns in ZBrush.

3DArtist username Matteo



RAINER DUDA

rd-innovations.de



It might not be all that common among hobbyists, but Clarisse has found a home in the pipelines of many of the biggest studios in the world. Rainer puts version 3.0 to the test on p78.

3DArtist username Rainerd



ERMANNO DI NICOLA

vimeo.com/8706817



Not only does Blackmagic Design make quality cameras - it also has its own compositing and VFX tool, which you can try for free! Ermanno explains what's new in Fusion 8 on p80.

3DArtist username n/a



JAMES CLARKE

jamesclarkewriter.wix.com



We're committed to getting great behind-the-scenes access at the world's most interesting and influential facilities. This month, James has had a chin wag with the legendary Tippett Studio on p32.

3DArtist username n/a

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Pizza Chen shows off how he creates hair for his 'The Little Brats' series



“One of the most important things I learned is to first understand what purpose the muscle has”

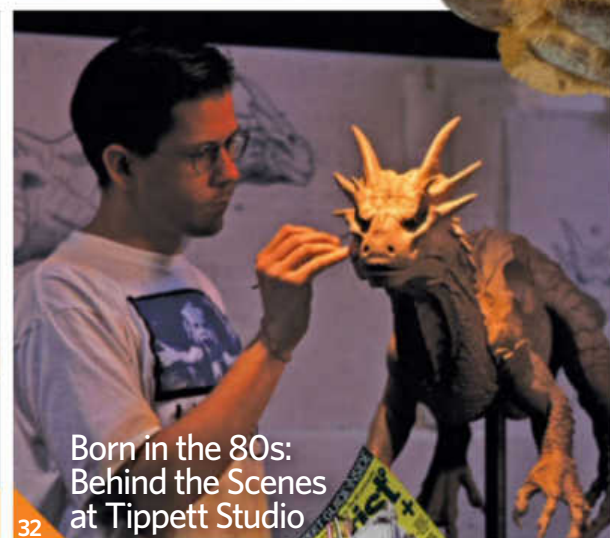
Tony Camehl on how to perfect animal anatomy
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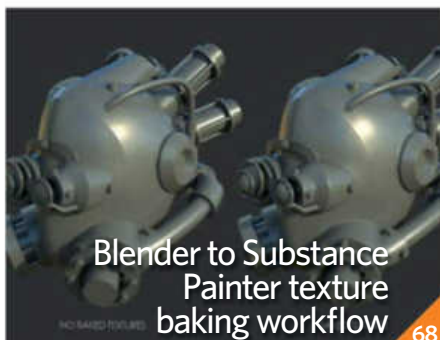
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Build your own epic
superhero movie titles

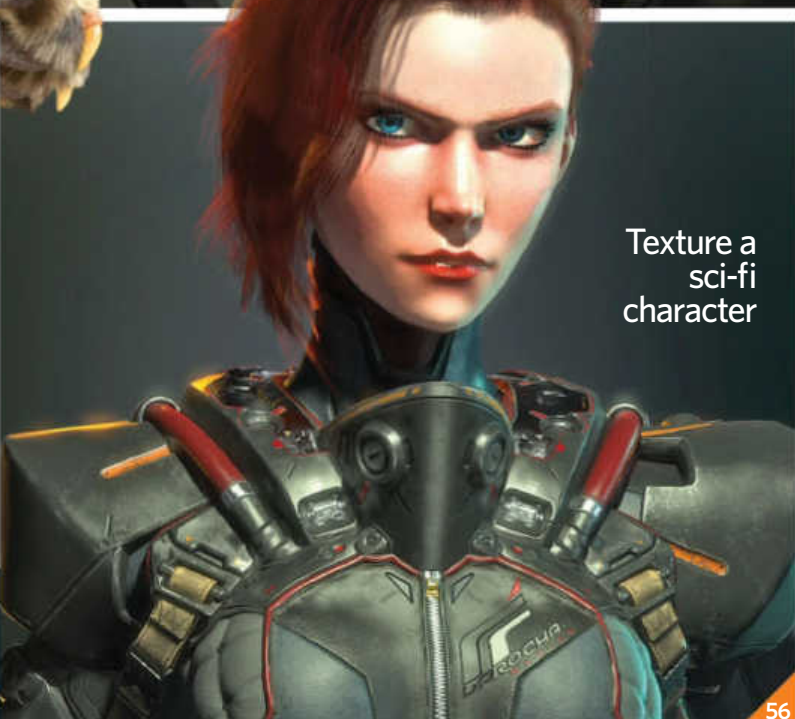
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“Our goals were to make a streamlined workflow for hard surfaces and Blender”

Jerry Perkins on why he made Blender plug-in Hard Ops **Page 30**

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sci-fi
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The very best images of the month from our online community
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“I wanted to represent a picturesque landscape featuring only a man-made machine – in this case, an old trawler. As far as I’m concerned, the most interesting and challenging part of 3D is to represent used, damaged and imperfect objects”

Rémy Trappier,
The Old Trawler, 2016



Rémy Trappier
www.behance.net/RemyTrapp

I've been doing 3D for about five years now. I love working on specific visual scenes

Software 3ds Max, V-Ray, Photoshop

Work in progress...







Manuel Peter
manuelpeter.com

Manuel is a 3D artist from Germany, specialising in creating realistic images

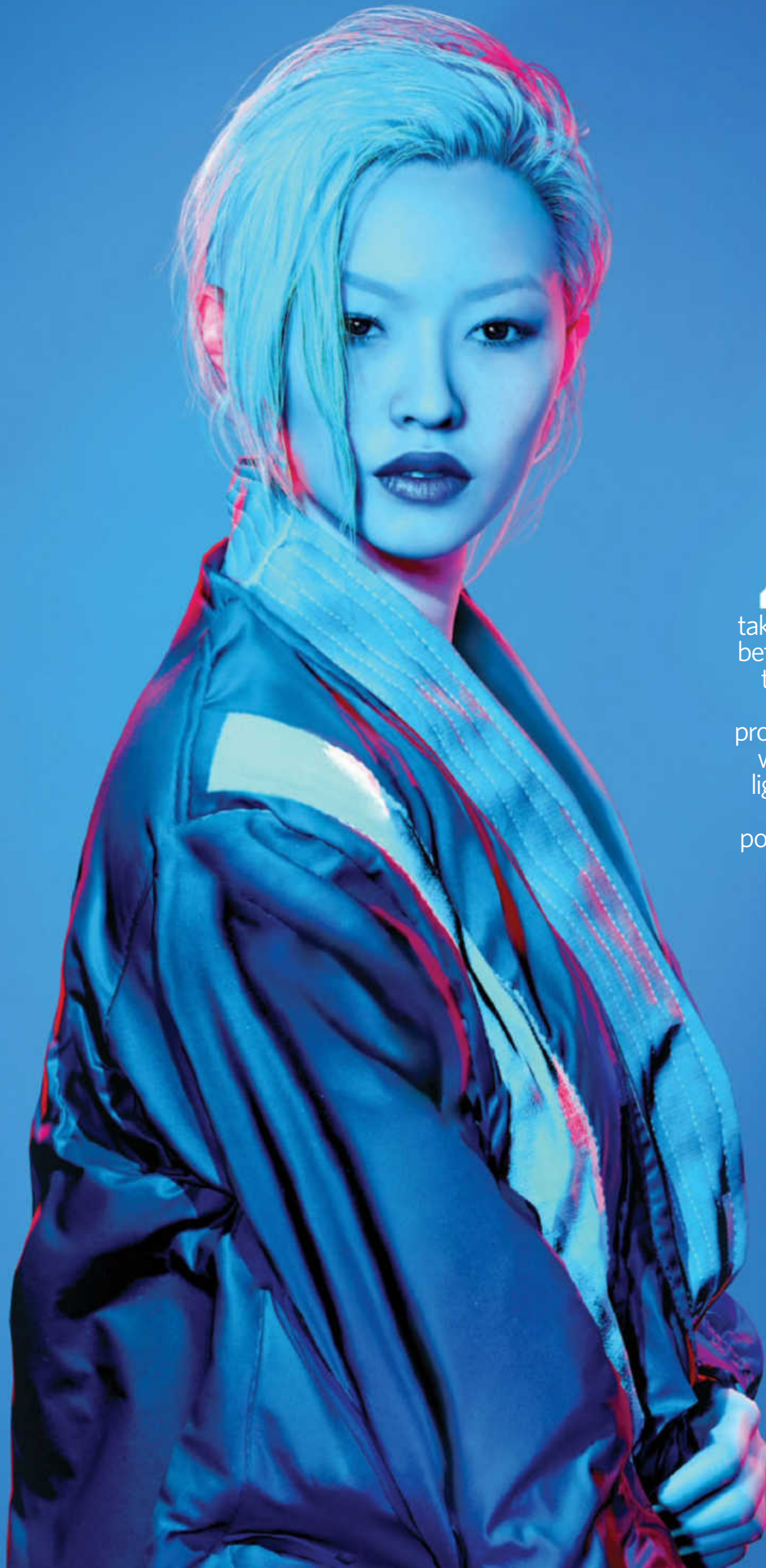
Software Blender, Photoshop

Work in progress...



“The image was created for the Trojan Horse was a Unicorn challenge on Artstation. In the scene there are two chemists trying to find the formula for the perfect society, and they finally found it. The ingredients are: empathy, individualism leading to pluralism, passion, respect for nature, tolerance, equality, creativity and liberty”

Manuel Peter,
The Experiment, 2016



Sanna Nivhede
sanna-nivhede.com

Sanna is a Stockholm-based character artist working for EA DICE

Software Maya, ZBrush, Quixel, Marmoset Toolbag 3 beta

Work in progress...



“I was very excited to take part in the Toolbag 3 beta and I made this real-time character with the purpose of trying the program out. I started out with a rough idea of the lighting setup and mood that I wanted for the portrait and kept working from there.”

Sanna Nivhede,
Ciel, 2016



Sergey Khomyakov
artstation.com/artist/dusk13

3DArtistOnline username:
LotusArt

Software ZBrush, KeyShot,
Photoshop

Work in progress...



“I had some free time and decided to practice some texturing and compositing. I created this work because I like horror styles, creatures and monsters”

Sergey Khomyakov,
Creature, 2016



Mateusz Gruszka
rhesus90.artstation.com

Mateusz is a 3D artist living in Poland, specialising in characters and creatures

Software ZBrush, 3ds Max, V-Ray, Photoshop

Work in progress...



“I really like to make monsters and creatures, but one day I accepted the challenge to do something different. I created this cute bat, based on art by talented artist Sydney Hanson”

Mateusz Gruszka,
Autumn Bat, 2016

The Gallery In depth





Mateusz Wielgus
designstudio.blackchilla.pl

Mateusz is a CG artist with an architectural background. He runs Black Chilla Design Studio

Software Blender, Photoshop

Work in progress...



“This image was my first attempt at making something other than architecture. My main goal and inspiration here was to create a 3D scene that would look like a shot from the Makoto Shinkai movie, *5 Centimeters Per Second*. In my pursuit of this particular look, I wanted to achieve an effect somewhere between anime and a real photo”

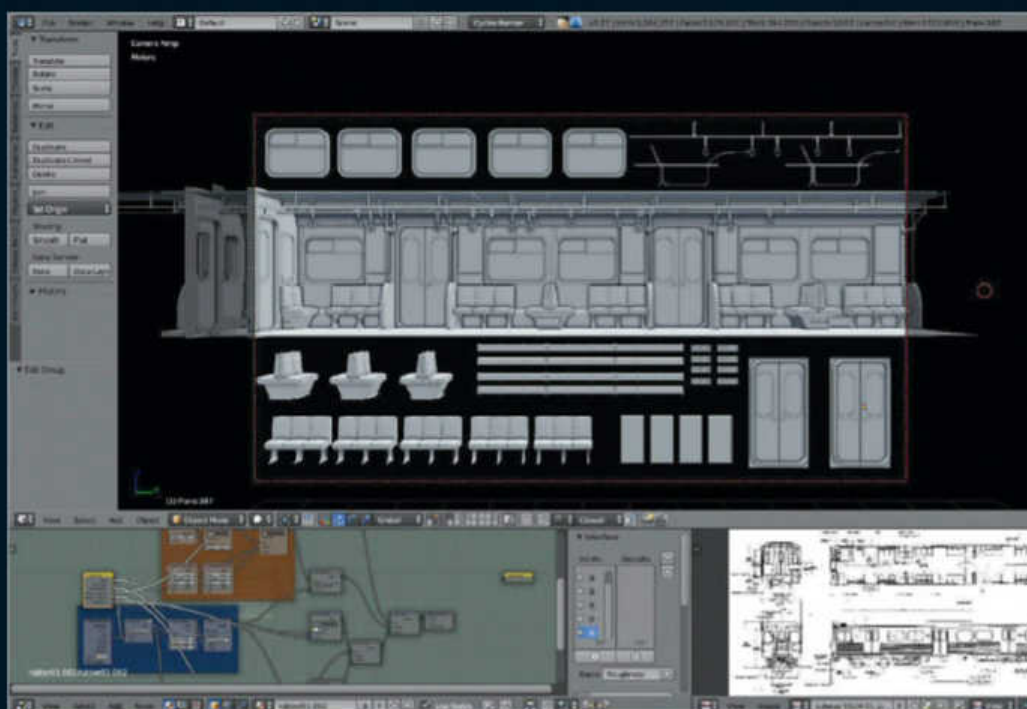
Mateusz Wielgus, *Grimm Train*, 2016

“There are no other materials or shaders other than from Cycles Material Vault with some additional dirt textures. I tried to achieve a unique style by using a strong main light in the background with plenty of ambient illumination”

Mateusz Wielgus,
Grimm Train, 2016

REFERENCING

RIGHT Since I've never created anything else other than architecture, it was very crucial for me to learn as much as I could about the subject by finding a lot of reference imagery.



LIGHTING

RIGHT After modelling was completed, the main light source was created. For achieving this warm/cold feel it was easier to bend materials to work with the lighting than the other way around.



POST-PRODUCTION

RIGHT Glow effects, colour grading and adding some smaller details were done in Photoshop. It is faster and gives you better control than trying to achieve same effects directly in 3D software.





MODELLING

Once enough information about the subject has been acquired, it's important to model everything in 3D using real-life dimensions. This helps to maintain a realistic look.



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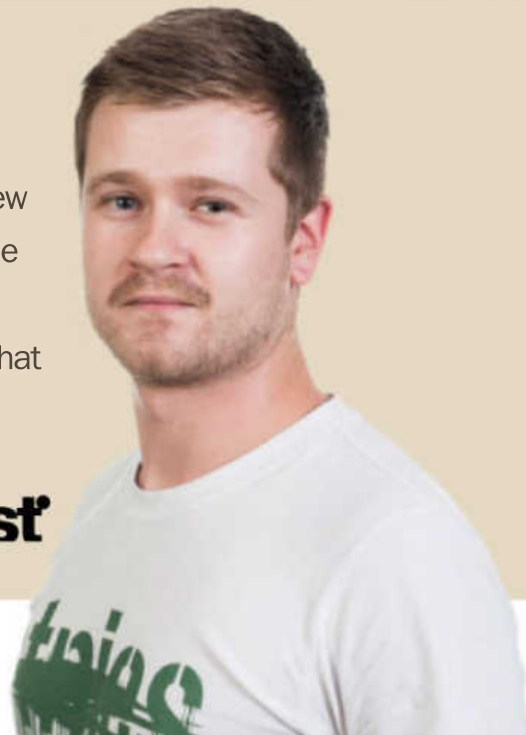
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We absolutely love making 3D Artist and we hope you love reading it, too. This year we want to make it even better, so we're asking for your help. By answering just a few questions, you could be selected to join the 3D Artist reader panel! Whatever your skill level or discipline, I'm so excited to hear what you have to say about our CG coverage.

Steve Holmes
Editor

3DArtist



Four changes you asked for in 2015...

Last year we used your input to make some fantastic improvements, including...

1 More artist interviews

Since our last survey, we've acted on your desire for more artist-focused content with bigger and better interview-led features



2 Modelling tutorials

No one part of the 3D pipeline is more important than any other, but you called for more modelling guides and we provided just that

3 Videogames content

We asked you which industry was the most appealing to work in. You chose games, so we added more asset and real-time tutorials



4 Tips & Tricks

You highlighted that tip-led features and easy-to-digest guides were important to you, so we've pulled out all the stops this year



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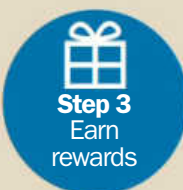
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30 HARD SURFACE SECRETS

Pros highlight the art of constructing tight edged and sleek hard-surface models

A hard-surface modeller is one of the most diverse and varied job titles in the industry; its definition varies from artist to artist. Some take hard surfaces to mean a model with a tight, clean mesh, few curves and hard edges. Others will take it to mean creating any man-made construct, so arch-vis would certainly come under this umbrella. But it could also mean a static rigid object that will not be animated – say, for example, a weapon.

Not only is the definition so free, so is the level of inspiration for hard-surface designs. Markus

Vogt suggests that the best references you can get are “of real-life hard surfaces and models.” Hristian Ivanov agrees, and says that for truly believable models, you should look around. “Your model should look good, but also it has to look believable,” he explains. “The internet is full of reference images, but also it’s everywhere around us. Cars, machines, buildings, parts and so on!” Whatever the definition, it’s clear that there is a whole world of models out there to be created, from vehicles, spaceships and robots to weapons and intricate environment props.





Deep Eyes,
by Juan Hernández

CONTRIBUTORS

TIM BERGHOLZ
chamferzone.com
Senior 3D artist
Ubisoft Toronto

GURMUKH BHASIN
gurmukhbhasin.com
Freelance concept artist

GERALD BLAISE
artstation.com/artist/geraldblaise
Senior hard-surface modeller at
Industrial Light & Magic

JUAN HERNÁNDEZ
artstation.com/artist/armoredwolf
Freelance artist

HRISTIAN IVANOV
artstation.com/artist/HristianShyne
Freelance 3D artist

NOAX
artstation.com/artist/noax00
Concept artist at Cloud Imperium
Games/Foundry 42

JERRY PERKINS
artstation.com/artist/
jerryperkins1447
Freelance modeller

ADRIAN RUTKOWSKI
adrianrutkowski.artstation.com
Freelance 3D artist

FURIO TEDESCHI
artstation.com/artist/furio
Freelance artist

MARKUS VOGT
markusvogt.eu
Freelance digital 2D
and 3D artist

REFERENCES AND START UP

01 GATHER YOUR REFERENCES
References are often the key to a great concept design or 3D model. Depending on what you are working on or what you want to create, make a folder of things you like – artists, real objects or vehicles and so on. Make a mood board of things that will guide you in your process.
Gerald Blaise

02 OBSERVE, DON'T REPLICATE
Observe the things you like and try to take in what it is that you like about them. This can come from anywhere, so make sure you understand why you like some art or general designs, but don't replicate what you see. Take what you like and put your own touch on it and always give credit to original inspiration.
Furio Tedeschi

03 SET IMPORTANT SHORTCUTS
Setting most often used shortcuts is crucial to speed up your workflow. In Cinema 4D, Rectangle or Live Selection needs to be set as function key on your tablet, Extrude and Extrude Inner need to be set as shortcuts as well as Bevel, Bridge and Knife. Those are most often used commands when it comes to fast and efficient hard-surface modelling.
Markus Vogt

04 USE ROBOTS AS INSPIRATION
All sorts of technical or robotic types of equipment work very well here. From there you can start off your 3D creations using references as the base mesh and then try to add your own detail and form development to make it unique to your taste or personal style.
Markus Vogt

05 DESIGN VARIETY
Interesting variation is also most important when it comes to good hard-surface models. Keep in mind to stay with mainly three different size variations or scales inside of your 3D models. For example, leaving a certain (larger) area free of small, micro details and filling another (smaller) part with tiny details gives an interesting appearance and variation, which appeals to the eye. Don't forget to add details symmetrically here and there. That is very characteristic for hard surfaces, or all kinds of technically constructed things.
Markus Vogt

06 LEARN MODO
MODO is a very commonly used software in the industry and it's easy to find how to use it with tutorials online. However, I would recommend checking out Vaughan Ling's and Tor Frick's tutorials, as they cover a wide range of subjects and workflows, as well as plugins and shortcuts to speed up your workflow.
NOAX



Helmet,
by Hristian Ivanov

Vanguard
spaceships at sunset
– Star Citizen, by
Gurmukh Bhasin and
Elwin Bachiller

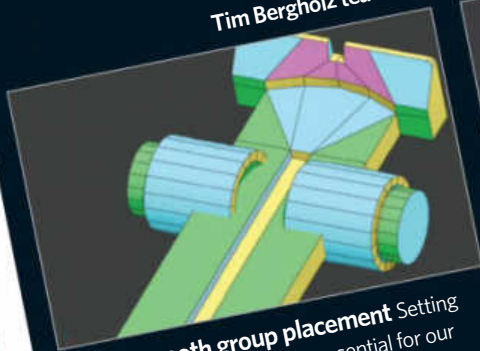


HEMTT M-1075,
by Gurmukh Bhasin

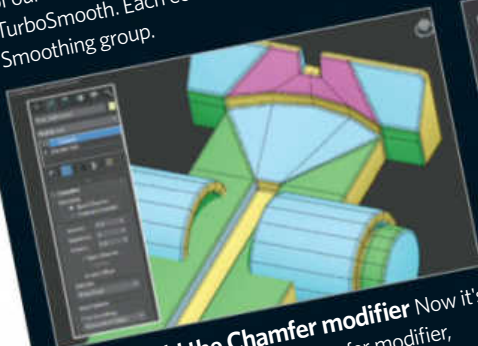


MODEL TRIPLE-A WEAPONS

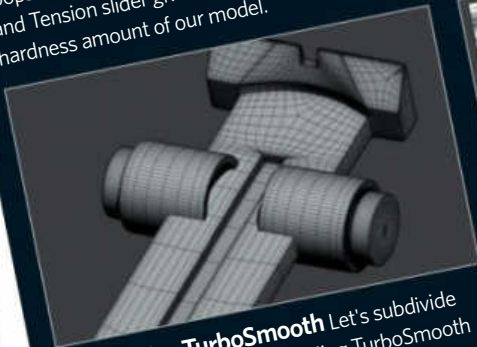
Tim Bergholz teaches you how to model quality game assets in 3ds Max



01 Smooth group placement Setting Smoothing groups is essential for our Chamfer modifier to work its muscle. By doing so we define which bordering sections will get support edges. Those edges are key for the look of our high-poly model once we apply the TurboSmooth. Each colour indicates a separate Smoothing group.



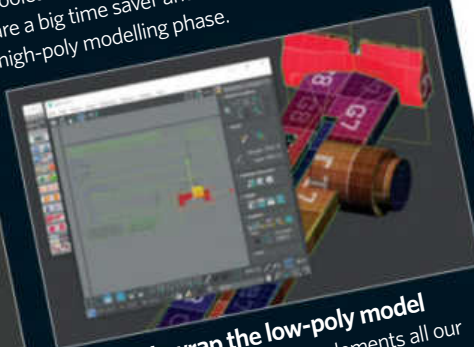
02 Add the Chamfer modifier Now it's time to apply the Chamfer modifier, which has been part of 3ds Max since the 2015 iteration. Make sure to set your settings to Unsmoothed Edges, which will place the edge loops around the Smoothing groups. The Crease and Tension slider gives us full control over the hardness amount of our model.



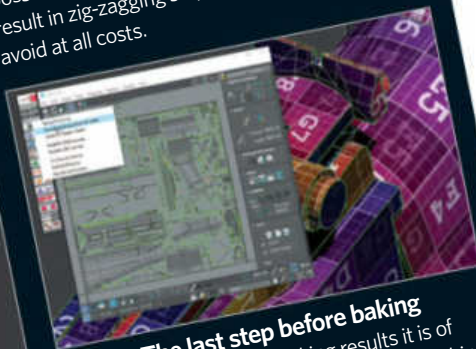
03 Use TurboSmooth Let's subdivide the geometry by adding TurboSmooth on top of the Chamfer modifier, which results in our high-poly model. Thanks to both Chamfer and TurboSmooth being modifiers, we can always toggle them and adjust the looks. That combination is the key for our non-destructive high-poly modelling workflow.



04 Do details quickly with floaters Floaters are small models, such as screws, bolts or text, which we place right above our high-poly model. They are an easy way to add details to our object while avoiding complex Boolean operations. Most importantly, floaters are a big time saver and usually round up the high-poly modelling phase.



05 Unwrap the low-poly model A clean unwrap complements all our previous work. For the ideal baking pass on a hard-surface object, it is a good practice to keep the UV island borders as straight and aligned as possible. Any distorted borders can otherwise result in zig-zagging steps, which we want to avoid at all costs.



06 The last step before baking For the perfect baking results it is of great importance to apply a separate Smoothing group to each UV island at the end of our unwrapping. The good news is that we let TexTools do that work for us. Hit the Smoothing Groups From UV Shells button and you should be done with the process.

BLOCK IN AND SCULPT

07 FOCUS ON SILHOUETTE AND SHAPE

Before getting too caught up in details or smaller volumes of your design, make sure you get the big overall silhouette in the first stages – do focus mostly on silhouette in the first stages – do not move onto the next step until you're happy with how things look.

Furio Tedeschi

08 PLAN OUT YOUR SHAPES

If you start to detail out just one part very early without blocking in the rest aren't the size or in the right place and you will have to redo all that hard work you already did.

Gurmukh Bhasin

09 MAKE A MAQUETTE

Blocking the proportions is essential to a successful piece. You have to make sure that your creation stands on its own and is functioning as a mechanical device. Just by drawing a few simple things to build what you want, you should quickly have something that already looks like what you're aiming for.

Gerald Blaise

10 USE LAZY MOUSE

Lazy Mouse is a feature in ZBrush that helps you sculpt smooth lines. It works on more than just normal brush strokes; you can also use it with curves or masks. It's great for clean cut-lines or masking patterns.

Juan Hernández

11 CURVE EDITABLE BRUSH

Use the Curve Editable brush in ZBrush for closed panel lines. It will close itself if you return to the start of the stroke. As it's a curve, you can also use curve functions on it, like frame polygroups. Click on it and it will draw the stroke.

Juan Hernández

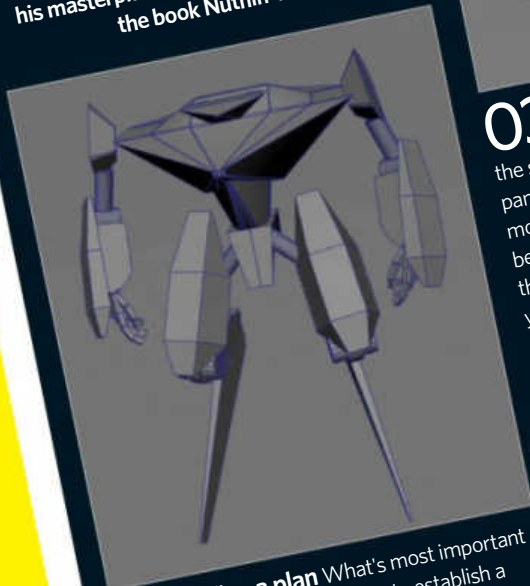


Juggernauts Deploy, by Furio Tedeschi



KITBASH A MECH

Hard-surface veteran Gerald Blaise gives us his masterplan for kitbashing Nobunaga for the book *Nuthin' But Mech Vol. 3*



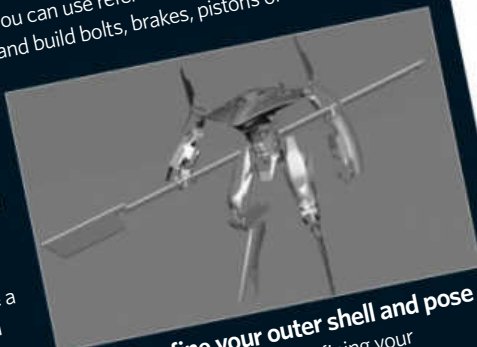
01 Define a plan What's most important before any kitbashing is to establish a plan, something to follow. Here, I want to create a mech, so what I do first is a very low-resolution maquette, known as a blocking model, where I roughly define my mech, its proportions and the style I'm going for.



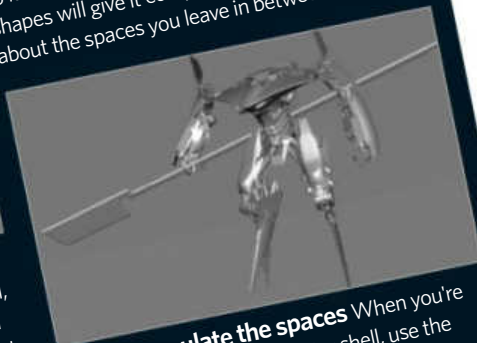
02 Pick a method Now think about replacing this model with an outer shell, something which will define the shapes of each part more precisely. For that I usually make a flat pattern, which I turn into panels and then deform them to roughly follow my maquette. Creating cool flat patterns, extruding a thickness and then applying a series of Bend deformers or even Lattices allows me to quickly build a parts library of different panels.



03 Build a parts library Try to think about your mech as a model kit: each of the shapes have to be replaced with a series of panels. You don't have to follow your blocking model exactly - even if you leave spaces in between panels, you're going to take care of those spaces later. When you've completed that you can use references from different vehicles and build bolts, brakes, pistons or engine parts.



04 Refine your outer shell and pose Spend some time refining your proportions and add some simple custom panels to it if you need to. The combination of simple shapes will give it complexity. Again, don't worry about the spaces you leave in between.



05 Populate the spaces When you're happy with your outer shell, use the pistons and engine parts from your parts library to fill up the spaces and make it look like it's functional. Try to assemble things in a way you would do with a real model kit.



Bike concept,
by Gerald Blaise





MESH AND POLYGONS

12 LOW POLYGONAL START OUT

In Cinema 4D, I always begin with a low-poly base mesh mainly from a Cube primitive or a flat polygon object. From there you can easily add your extrusions and start to block out forms and shapes using single-point editing. Now you can add all your necessary polys by simply using the Knife tool or the Loop Cut. Step by step, add your details using Edge Extrude in combination with Extrude Inner, always keeping the main and overall shape in mind. To make a solid 3D object out of a flat plane simply select all your faces and execute the Extrude command. Be sure to check the Create Caps option.

Markus Vogt

13 USE MODO FOR QUICK LOW-POLY CONCEPTS

The Round Edge shader can be applied to any material and fakes a rounded edge in the render. By doing this I save a lot of time while in my conception phase. I tend to use a lot of Booleans and MODO handles that work really well without using subdivisions or mesh fusion.

NOAX

14 NEW TOPOLOGY

In ZBrush you can retopologise complex areas of your sketch into separate pieces with the Topology brush. Increase the brush intensity above 0 if you want thickness. Once you have the new topology, use Snake Hook and Opt/Alt to slide it over geometry underneath.

Juan Hernández

15 DON'T LOOP YOUR EDGE LOOPS

Creating hidden holes in your mesh when hard-surface modelling can be a good way to manage edge loops. If you have the opportunity to hide a hole behind another piece of geometry, you can have stray edge loops run into those holes and not have to line up with an edge on the other side.

Gurmukh Bhasin

16 SUBSEQUENT BOOLEANS? TRY THE CLEAN MESH FUNCTION!

When using Booleans repeatedly sometimes the geometry is less optimal than wanted and it affects the behaviour of the bevel. You can simplify this with the Hard Ops for Blender plugin. For Boolean-based modelling I try to simplify surfaces to prevent geometric errors for maximum efficiency by going to Q>Meshtools>Clean mesh (E).

Jerry Perkins

17 RADIAL MODELLING? TRY THE ATWIST 360

One of the oldest functions in the Hard Ops for Blender plugin is still my favourite. It arrays the asset then deforms it to 360 degrees. I still use this for the majority of my radial modelling needs. To apply it to all and remove doubles use Meshtools>Clean Recenter (S) and the origin will be correct with modifiers applied. Then the model is ready for a (C) Sharpen or (S) Sharpen.

Jerry Perkins

18 CUT SHAPES

In Hard Ops, you can Bool a cube but keep it live. Add a B-width (bevel modifier), then combine it with the T-thick and you can use that shape to cut panels. We made changes to the Q menu for Bool shapes so you can try this out as a quick combo.

Adrian Rutkowski

19 SUBDIVIDE LOCALLY

You can subdivide specific areas of your mesh by masking the area, inverting the mask, and then subdividing. Now you can use that highly detailed Alpha without making the overall polycount too high.

Juan Hernández

20 PANEL EXTRUSIONS


My favourite way to create panels or plates in ZBrush is with the Panel Loops function, because it can taper the extrusion. Simply polygroup an area, isolate it and hit Panel Loops. You can then ZRemesh at a low polycount for potential future detail with ZModeler.

Juan Hernández

21 BEVEL IT

Don't forget to finish your hard-surface meshes or nurmies with beveled edges so that the light can react to them in rendering. Edges that look too hard always look a bit unrealistic. For many cases the standard settings of C4D's Bevel tool should work fine here. Keep in mind that even hard surfaces should contain some softer edges or rounded shapes here and there to add interest and variety. Don't forget to try the Bevel tool in Bezier mode!

Markus Vogt



B2-H6,
by Jerry Perkins



Bionic hand,
by Hristian Ivanov



KITBASH AND REFINE MODELLED PARTS

22 USE KITBASH TO DEVELOP YOUR STYLE

If you are new to working with kitbash and using other artists' toolsets, don't let it totally drive your design. For instance, use it more as visual background detailing rather than dictating your full design or major elements of your design. I think once an artist understands the benefits and where you can use kitbash parts they should start creating their own base meshes for kitbash.

Furio Tedeschi

23 TEST OUT SMOOTH SHAPES WITH A BLINN

It is important to use a Blinn material on your mesh in Maya to make sure it is looking the way you intend for it to once it is smoothed. A Blinn will catch the light much better than a lambert and will show you places in your mesh where there are dimples, dents and pinches that you may not want. These imperfections in your mesh can often be subtle, but they will show up in your renders and distract from the final image.

Gurmukh Bhasin

24 MAKE A KITBASH LIBRARY

A good idea is to create your own kitbash library. A lot of people are sharing their kitbash sets, but you can create your own. That's how you can increase your speed or your effectiveness.

Hristian Ivanov

25 ALWAYS RESPECT MECHANICAL JOINTS

Robotics generally have a lot of restrictions on movement and this really sets the foundations of the design (function over design). This is obviously an illusion, so I do encourage artists to explore, but nevertheless to respect and get a believable design. Understanding how joints interact with each other and conveying this in your designs will make them more believable.

Furio Tedeschi

26 DO PARTS SEPARATELY

Once you have a good idea and you are happy with your blocking model, stick to it. Now it's all about replacing it with a detailed version inspired by the references you gathered before. You can even take each part as a different problem (arm, torso and so on) and put it together at the end for a last pass to unify it.

Gerald Blaise

4 TOP PLUGINS TO PERFECT MODELS

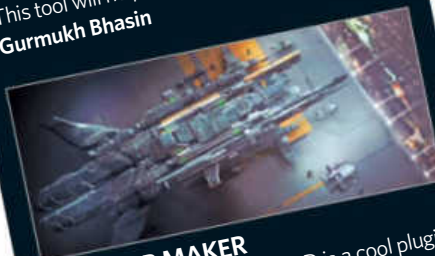
Our experts tell us their favourite plugins for creating better hard-surface models



ZEN TOOLS

Zen Tools is an amazing free script for Maya. I mostly just use the Curve Distribute Between Vertices part in the modelling section to evenly distribute vertices on curved surfaces. This tool will help smooth everything out.

Gurmukh Bhasin



CHAMFER MAKER

Chamfer Maker for Cinema 4D is a cool plugin to bevel or chamfer the edges of your model. It features versatile settings for a fully procedural object manager tree. It deals with complicated geometry well, too.

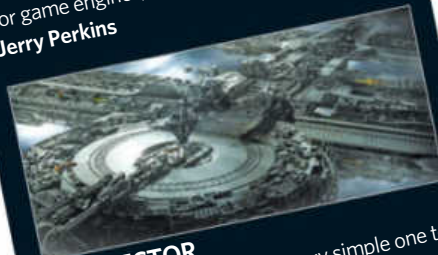
Markus Vogt



HARD OPS

Our goals were to make a streamlined workflow for hard surfaces and Blender. The flexibility of Blender lets us work alongside the software's development. We've made it better for game engines, baking and production.

Jerry Perkins



RE-SELECTOR

The Re-Selector plug-in is a very simple one to randomly select faces, edges or points for use in C4D. You can add or subtract to your selection in percentage values. I use it often and in most cases of my modelling process.

Markus Vogt



27 KEEP IT SIMPLE!

You can build complex-looking models by combining simple shapes together. Most of my concept kitbash pieces are coming from flat patterns that I've bent or deformed using a Bend or Lattice deformer in Maya. A series of simple operations can make a complex-looking shape. Most of my panels on the bike concept and for Nobunaga were made with this technique.

Gerald Blaise

28 USE THREE EDGES

When working with subdivisions I will use three edges to control the shape curvature. Having only two edges will not give you any control of how the shape will smooth and having more than three edges is adding more polygons to your model than necessary. The middle edge is the one that defines the general shape, and the edges on each side define how tight or loose the shape is going to smooth.

Gurmukh Bhasin

29 THINK MODULAR

Keep everything you build - each of the pieces can be used later. By thinking in a modular way you will be able to go faster. The more you do, the more you can re-use pieces here and there. Think about it as a nice-looking Lego object, except it's up to you to build the bricks. It's pretty much the way I was thinking when I created the bike concept and when I did Nobunaga for the book *Nuthin' But Mech Vol. 3*.

Gerald Blaise

30 COMPLEX SHAPES

I find it easiest to break complex shapes up into smaller parts and focus on one piece at a time. For my HEMTT M-1075 truck, I broke up the front cab of the truck into parts so it was easier to add supporting edges. Once I've modelled each part the way I want it to look, I combine the pieces and add edges in places that need it to keep the edges flowing properly.

Gurmukh Bhasin

Deep Eyes
retopologised into
smaller parts, and
detailed with ZModeler
and Alphas

Alphas
Panel Loops
Insert Brushes
Retopologized
Curve Editable



What is best in life?
To crush your triangles.

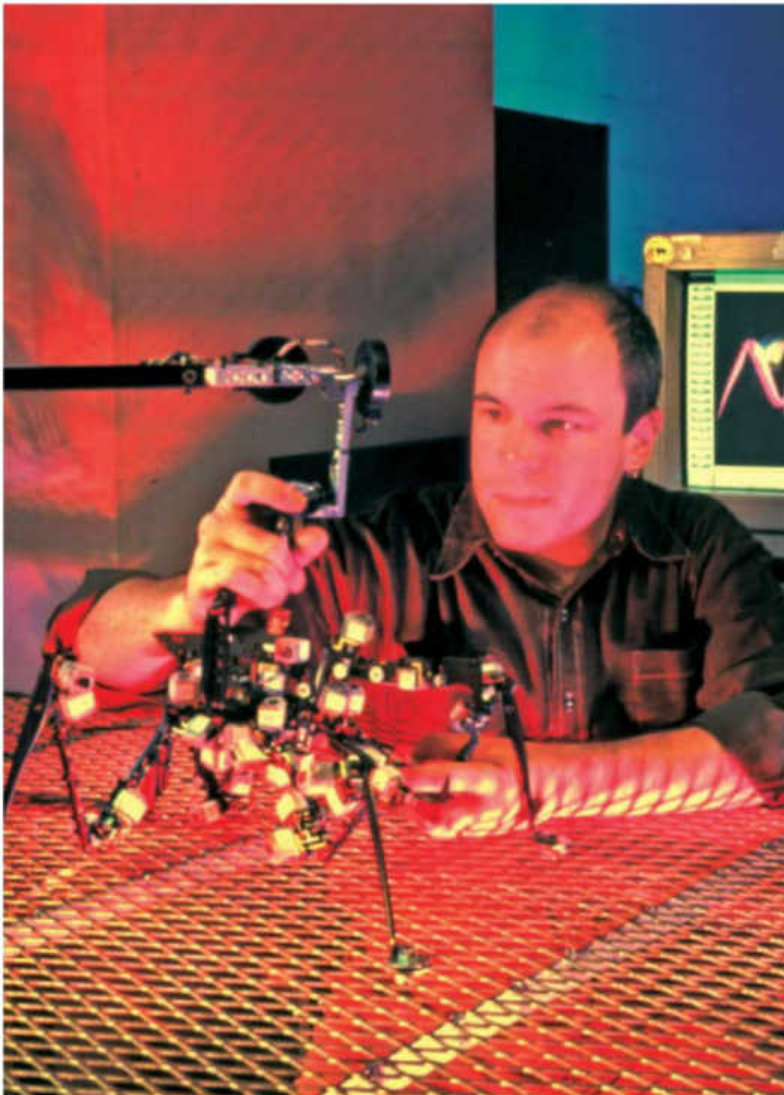


Houdini

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Creature artwork: Tanvir Islam





BORN IN THE 80s



BEHIND THE SCENES AT

TIPPETT STUDIO

We sit down and with Phil Tippet and several of his colleagues to hear all about the life and times of the legendary VFX facility

If you've seen the velociraptors whip into action in *Jurassic World* or the wolves run and leap in *Twilight*, or if you've laughed at the antics of the bear-about-town in *Ted* or felt transported by the environments reached in *The Matrix* then you've witnessed images and characters that are recognised globally. Then, too, if you have a smartphone you may have been entertained in recent years by the app, Efexio, which allows you to place photorealistic-looking animated creatures into your own short movie clips. Much more recently, if you're a game player, you might have watched the amusing and strikingly animated commercial for the hugely popular Japanese mobile game *Monster Strike*. All of these creatures, characters and situations have been brought to

life on various screens by Tippet Studio, based in Berkeley, on the eastern side of San Francisco Bay.

Significantly, Tippet Studio has found a way to diversify while remaining efficient, enduring and creative in a climate that can be very tough for VFX studios. As Phil Tippet and his colleagues all attest, finding the balance between expansion and remaining viable is a fine line to walk.

Around the table for this conversation that spanned creative choices, collaboration and what makes for a good collective and creative vibe were: Phil Tippet (founder), Niketa Roman (PR and social media), Kent Matheson (senior environments artist), Alex Hessler (CG supervisor) and Belinda Valkenburg (senior texture painter).

Tippet Studio specialises in character design and animation, and its portfolio includes movies, mobile content and VR



Phil Tippett sets the scene for how the studio started. "After working on the *Star Wars* movies and whatnot, I took a year off and made a 16mm movie in my garage called *Prehistoric Beast*," he begins. "It was about 12 minutes long and my intention was to inspire kids to be interested in dinosaurs. All the distributors I went to said 'it's too scary'. So, it languished out there and we were biding our time and I got a call from a producer in NYC. He'd seen *Prehistoric Beast* and wanted to make a TV special about dinosaurs and it was called *Dinosaur!*. Christopher Reeve narrated it and we got on the air in 1985. That was the way we began, through no intention of my own. It was easy to get hired - I never thought about marketing."

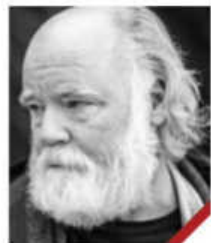
"I worked on *Willow* and *Howard The Duck* and then took on projects at my own studio - *RoboCop* and *Honey, I Shrunk The Kids*. It was kind of like salad days: work came our way. Then, over the years, there were a few cataclysmic transitions. We had developed new technology, go motion, and we used that up until *Jurassic Park*." With Spielberg's dinosaur adventure, "Everything went digital and Tippett Studio went digital." One of the first major post-*Jurassic* digital projects for the studio was *Starship Troopers*, which reunited Tippett with *RoboCop* director Paul Verhoeven. The studio brought those massive bugs to life at their studio in Berkeley. It's no longer only movies that the studio handles. It also produces animation and other visual effects for commercials, mobile content, VR and theme parks, and the studio's work now embraces both American and east Asian entertainment industries.

Of the digital shift that had begun in the Eighties, and which achieved critical mass in the early Nineties, Tippett recalls that for such a hands-on animator that usually stood up to execute the work, the new work environment that digital animation engendered was a surprise.

"Digital was a precipitous learning curve for me and my takeaway was that I didn't understand any of it! 'You sit at a desk?'" He goes on: "Inadvertently, I got kicked upstairs because I knew how to help directors and producers design characters and shots. That was what I knew how to do. On the so-called creative management side, there's a real creative function behind a shared history: it sounds mystical, and I'm not mystical at

all - you get on a telepathic wavelength. You have such a shared history. We have our share of complicated meetings about how to approach a project, but on a broader, creative level it's kind of like, 'let's put on a show.'" Tippett oversees that impulse at the studio with his wife and co-CEO Jules Roman. He adds, "If you're an independent you have to be like a guerilla." This capacity to respond in a dynamic way to new opportunities and to begin translating a skillset and history rooted in traditional genre filmmaking to various media platforms is allowing Tippett Studio the chance to redefine its scope. It remains very identifiable with movies like *Cloverfield*, *Hellboy* and *Charlotte's Web* while maintaining a presence in the commercial world and, recently, finding success in the theme park and mobile content worlds.

The conversation refocuses around the new, emerging entertainment possibility of VR. Given the degree to which Tippett Studio has long been synonymous with dazzling creature design and believable animated character performance, it's also worth noting how much work is now undertaken by the studio in its delivery of environment work for film. Kent Matheson notes, "One of the things that I've been working on is environments. Now, more and more, we have to put creatures into environments. Our environment work goes back to cityscapes for *The Matrix*, but it's really



“Working on Jurassic Park, you really don't know what you've got until the end of the day”

Phil Tippett, founder of Tippett Studio

a new world in VR where the environments have to be completely created to a new real-looking level."

Given the wealth of experience that underpins the work of the studio it's a little bit surprising - and charming - when Tippett describes the sense of surprise that can occur when a completed project is first viewed in full and there's a realisation that the creative mission has been achieved. "If you're working on *RoboCop* or *Jurassic Park*, you really don't know what you've got until the end of the day," he quips. He goes on to recall producer Kathleen Kennedy inviting him (and Dennis Muren of ILM) to see the answer print of *Jurassic Park*. It was only then that they realised their trailblazing approach to realising the dinosaurs had worked. Tippett recalls thinking, "Oh my gosh - we did it."

A NEW HORIZON

Like all industries, the VFX industry is routinely exposed to changing dynamics far beyond their immediate horizon and Tippett makes the point

CRAFTING A CREATURE

Bringing characters to life - historical or mythological - is no easy feat

For the recently produced visual effects material for the Chinese production *League Of Gods*, Tippett Studio was commissioned to create characters and environments that visualised the Ming dynasty story *Fengshen Yanyi*. Tippett Studio was awarded the commission and demonstrated what was possible in a way that eased the creative task that confronted the team already on the project. For the film, Tippett Studio created a CG baby named Naza, the challenge of the character design largely resting on an approach that honoured the affection of Chinese audiences for the character.

On *Jurassic World*, Tippett Studio advised and consulted on the realistic character performance of the velociraptors. In the movie, a raptor pack is presented in such a way that the audience wonders if these creatures are going to prove themselves to be prehistoric heroes or villains. Tippett Studio's character work for the project was concerned not only with realism of movement, but also with bringing a real sense of the raptors' intentions as characters to a given scene. It was the same attention to detail that the studio had brought to its work many years before on *Jurassic Park* and, back before that, to Phil Tippett's earlier involvement on the original *Star Wars* trilogy.

Alex Hessler, who has been at Tippett Studio for almost two years, describes the creative vibe at the studio by saying, "There's a strong and natural flow to creating characters. Everyone here just goes into it. It doesn't take a lot of wrangling to make an awesome character. There's this internal culture here that has not been bulldozed by the industry. There's always an opportunity to add our own touches."

Of the studio's creative collaboration between its artists, Kent Matheson enthuses that whatever the project's scope, challenge or platform, the sensibility underpinning the effort is one of "let's pull together and do the very best we can".

Over its 32-year history, Tippett Studio has realised creatures for projects that include the films *Evolution*, *Enchanted*, *The Spiderwick Chronicles* and *Drag Me To Hell*. In the 2015 release *Star Wars: The Force Awakens*, the studio revisited Tippett's original stop-motion work for the chessboard scene in *Star Wars* and rendered a freshly realised, but fleeting, throwback to the original movie of 1977.



The studio's workspace is packed out with models, conceptual design work and other mementos of decades' long work



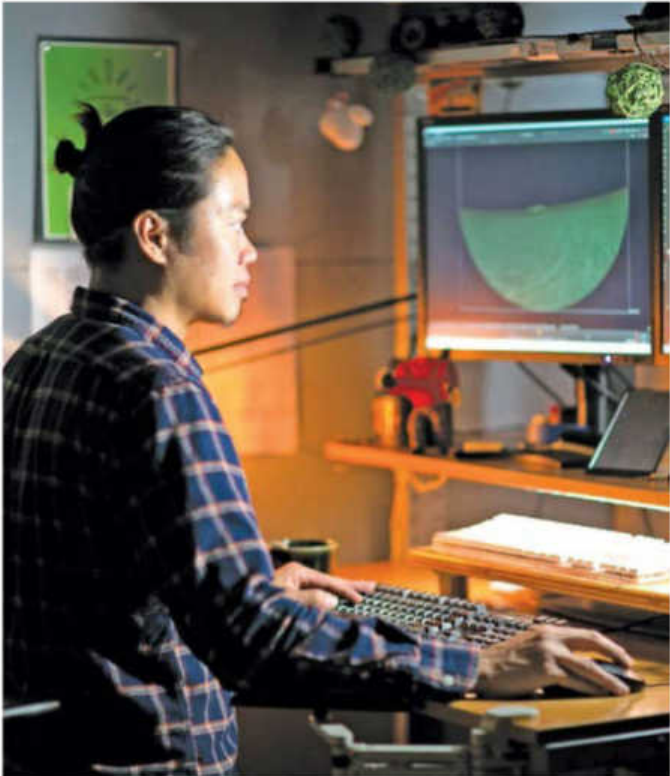
Phil Tippett leads a review session at the studio during work on the recent *Dream Of Anhui* theme park project



Vivid character design drawing on real-world references is key to creating fantasy characters

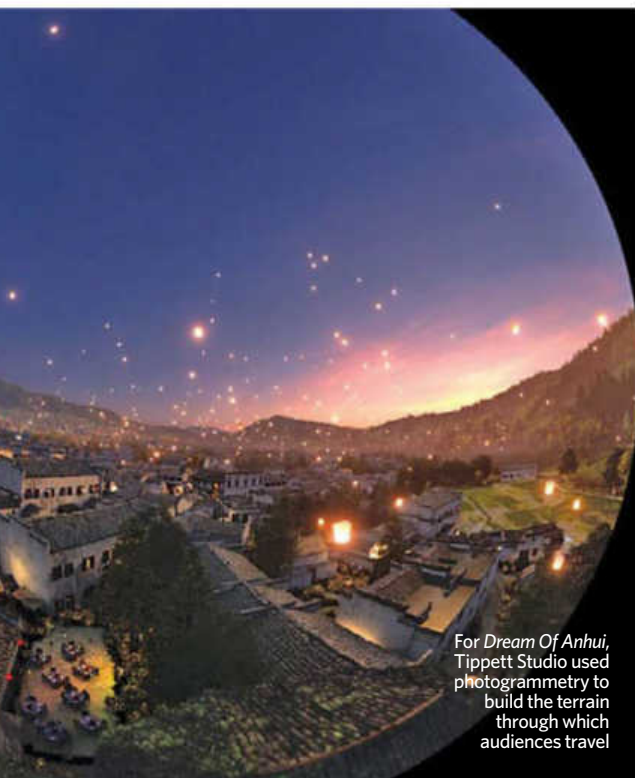


Lighting and detailed fabrics bring believability to this stop-motion character





Prehistoric Beast was the project that helped Tippet Studio to establish its reputation for realism in creature effects



For Dream Of Anhui, Tippet Studio used photogrammetry to build the terrain through which audiences travel



CREATIVE CULTURE AT TIPPETT

Tippet Studio staff discuss what it is that makes the place tick

Of the strengths of the studio, Belinda Valkenburg, who returned to the fold after 14 years of working at other, larger studios, explains that, "We have a small, lean team. I think that we're always being creative. I missed the creativity. You're not a cog in the wheel; you get your hands dirty here." Hessler makes the point that, sometimes, a visual effects studio can expand too much and the financial implications can have difficult repercussions.

Kent Matheson continues, "A great joy about Tippet Studio is that you're handed a shot and trust and a scary responsibility. It keeps you on your toes. We're a small shop and you're encouraged to bring your creativity to it." Of this person-centred approach, Niketa Roman explains, "At Tippet, we have an attrition rate far above average - probably around eight to ten years - and that makes us strong." Matheson talks about the strength that can be found in a modestly scaled operation at the studio: "We are small and nimble and able to choose appropriate solutions. I have 100 per cent faith that we'll make the right choices."

Of the perception of Tippet Studio as it currently stands, Niketa Roman observes that, critically, the studio is seen as a place of "artists rather than technicians: guiding newer directors through the process of VFX and animation, discussing what will be successful and what won't. I like the phrase 'creative compass,'" Roman adds, summing up this approach to visual effects in terms of both the creative choices made and the practical realities available to realise a bold idea.

that five years ago the studio couldn't have anticipated the importance of China to its work. He says: "A bunch of things have transpired; globalisation changed the playing field on our side. Almost overnight, all the work started going offshore. Lo and behold, who should come to our rescue but the Chinese and a whole new world of VR and AR."

Of Tippet Studio's newfound connection with the Chinese entertainment industry, Tippet notes that significantly he and his team are considered as a "creative partner, like the old days". Tippet uses this to counter his analysis of the situation that can occur when working with the major Hollywood studios. Alex Hessler adds, "They're a new market and what they need out of a VFX studio is a consultant." Tippet Studio has recently been commissioned to provide character and environment work for two major projects: *League Of Gods* and *Dream Of Anhui*.

In its theme park ride project, *Dream Of Anhui*, Tippet Studio has worked as creative collaborator and Matheson describes it as "a real discovery. They required over five minutes of complete CG and it pretty quickly became obvious that China in their imagination is different to China in reality. We did 12 environments with dramatic camera flyovers over fields, rivers, cities and mountainscapes." Hessler notes that the Oculus headsets that were used as part of the toolkit with which to review material for the *Dream Of Anhui* project are now used much more routinely at the studio as a tool for reviewing material across a range of projects. Hessler also points out the theme park ride project allowed for the studio to develop an approach that, again, can be applied across various projects: "Because the ride is presented in 180 degrees we bought a dome and brought in an Oculus Rift and played the ride back through these. It allowed us to evaluate the moves." Hessler also notes a particular aspect of the studio's work on



“At Tippet we have an attrition rate far above average and that makes us strong”

Niketa Roman, PR and social media at Tippet Studio

environment creation for the project, explaining that the team deployed photogrammetry to make the first version of environment. "We ran drone footage through photogrammetry to turn it into a mesh [for] a good scale model."

ENERGY IS CREATIVE DELIGHT

Our conversation moves onto a consideration of what makes the studio unique, and Tippet makes the point that "when you have respect for the work, you want people working and doing their thing. We try and keep dailies as short as possible so people can get back to work."

Of his role as CEO, Tippet looks back to the work he undertook in the Eighties as a clue for how to best oversee a creative environment. He remarks that in his work with George Lucas, Steven Spielberg and Paul Verhoeven he recognised that "the best directors were the most inclusive. Hire the best people that you can who aren't neurotic. That inspires more creativity. There's more ownership for the people making the stuff. My direction's almost non-directing." When it comes to engaging with the various processes, Tippet states, "Intentionally, I've stayed kind of dumb." In doing so, it allows him to maintain a creatively intuitive space in a process that's finely calibrated. From the conversation between everyone around the table, this need to remain at least partly intuitive – in terms of both realising an effect and in terms of staying alert to bigger picture opportunities – is key.

Tippet defines one quality as a key distinction between Tippet Studios and other animation and visual effects studios: "One of the distinctions about us over ILM or a Pixar is that we're essentially a 'mom and pop' shop. My wife, Jules Roman, is the CEO of the company. It's a company run by a husband-and-wife team. We're here by virtue of our talent."

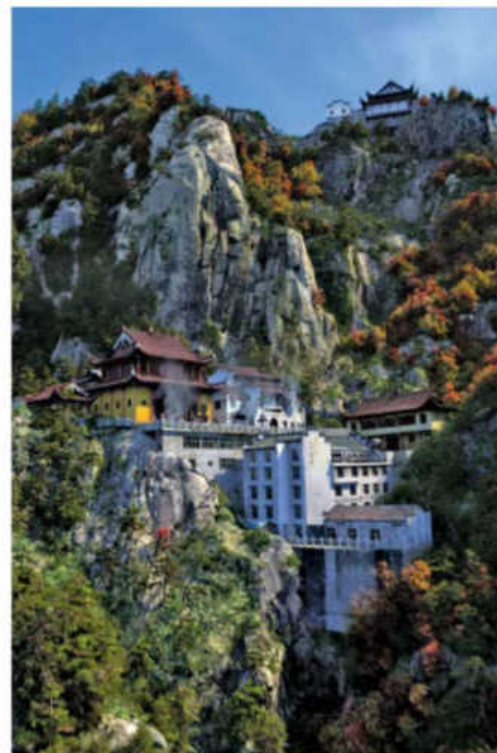


“We ran drone footage through photogrammetry to turn it into a mesh [for] a good scale model”

Alex Hessler, CG supervisor at Tippet Studio



The studio's founder Phil Tippet working on set



VFX supervisor Chris Morley and survey artist Devin Breese gather colour reference on set

The future of VR and Tippet

Tippet Studio wrangles with the new world of virtual reality

With characteristic honesty, Tippet notes that with regards to virtual reality, "Nobody knows anything about how to deal with VR in terms of what it's asking you to do and what it can deliver in terms of content. It's applied to a number of disciplines. In terms of entertainment, one camp is ardently into pursuing the three-act structure (using VR). [In the other camp] others believe that it gives you something totally unique. VR gives us a format that on a creative level is totally new. VR is unique to itself. When I work on material things with my hands, it's your responsibility to respect that."

Matheson offers up a useful sense of the current state of play in the VR world, explaining that "VR is such a weird new format: people at studios are working out what you do with it." He even makes an analogy with the experimentation currently being undertaken across the industry, enthusiastically noting, "It's like the birth of film". Like the early cinema pioneers there are now VR pioneers and they are in the earliest days of establishing its visual language. With a clear sense of pride, Matheson adds, "The VFX industry was centred in the Bay area and so is the VR and AR industry."

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Find out how to create amazing creatures, from concept through to modelling, texturing, lighting and rendering, and get ahead of the pack

Creating top animal renders is no mean feat. Not only does it have to look real, there are a whole flock of nuances in every single part of the workflow – all with the goal of ending up with a captivating final image. Some artists have been enchanted by zoology from a young age, and have ended up dedicating their 3D careers to wildlife, as creature designer and 3D concept artist Tony Camehl tells us: “It all started when I saw *Star Wars: Episode I – The Phantom Menace* for the first time. I quickly got fascinated by the creatures appearing in that movie. After that I tried to copy the monsters from *Pokémon* and got hooked by creatures of all kind. Since I

have been young, my family always had a few pets, mostly the usual ones like cats and dogs. So I guess my passion for creatures and animals in particular has always been very strong.”

Others have fallen in love with the process while already working in the industry, like Eric Keller, who initially started off as a CG artist. “When you find an artistic subject that you truly love, you never run out of inspiration,” he says. No matter their inspiration, we’ve gathered together a group of top wildlife artists, from anatomy masters to lighting experts and even a wildlife photographer, to teach you how to tame your own animal artwork from scratch.

SOURCE THE BEST REFERENCES

Eric Keller is a “bug nerd” as he calls himself: “Insects and arachnids are the perfect subject for exploration in CG. They have it all – weird shapes, fascinating behaviours, endless diversity, and plenty of room for exploration.” Keller has been a modeller for almost two decades – though his love for rendering insects only came about in the last few years. Still, he’s developed plenty of tricks in his continual study of insects and other animals, but there’s one point that he reiterates: “It’s all about the reference: without good reference you can’t create anything worthwhile.”

You can turn to Google for a couple of references of course, and it’s a routine that is embedded in most workflows – creating a moodboard filled with angles and photos of the animal you want to render becomes almost second nature. Tony Camehl certainly uses lots of reference images from the web for his animal ecorche and skeleton studies. “These reference images range from pictures showing the skeleton as well as the muscles, but also several wildlife photos showing me how the animal looks from different angles, how tall it is and its behaviour,” he explains. Indeed, illustrator Rodrigo Gelmi strived to use photos to create a lion that was not “typically found in the CG world, only commonly found in photography”.

Keller goes a bit further than using photography, whether from the web or even doing his own, as he orders his own sample specimens of insects that he wants to re-create in 3D. “You can get specimens at insect fairs, order them online or even set up a trap in your backyard. I examine the insects under a dissecting microscope, and have an extensive and ever-expanding library of books on insect biology... Spending time with live insects is important. Although it can be subtle – there are big differences between a live bug and a dead bug.”

Indeed, other artists, such as 3D generalists Tomasz Wysołmierski and Monika Olizarowicz, attribute the ability to re-render the likeness of their bee to watching it in front of their eyes: “Seeing your subject move and from different angles really helps in understanding the shape and range of motion”.

And it’s not just seeing the animal itself that lends to creating better renders each time; Keller befriended some of the scientists at Los Angeles Museum of Natural History and entomologists from Shot Macro Photography workshops, and he asks them to critique his insect renders. “It’s really crucial to have an expert eye review your work... Having someone who can answer questions or critique your models’ anatomy is a massive help. The best thing about scientists is that they love to talk about their work, and it’s amazing to learn how much there is left to discover about insects.”



Lion Muscles,
by Tony Camehl



THE ANATOMY OF A SCULPT

There will be differences between an animal model and a human model, what with the myriad bipeds, quadrupeds and other multi-limbed creatures that exist in the animal kingdom. So any artists that are new to creating wildlife renders should be aware of these disparities beforehand. “If you already know human anatomy, it is easier to learn the muscles of an animal even if they appear totally different from the human muscle system,” explains Camehl. “Most quadrupeds have the same muscles we have. A cat has deltoid muscles just like we do, but a cat’s deltoids are attached differently to their body compared to a human deltoid.”

And of course, there will be different bones on a quadruped compared to a human. “A quadruped, such as a big cat, is walking on four legs and not on two,” he continues. “That means that bones like the scapula and the pelvis look different in comparison to the human bones.

“It also happens often that a bone from a quadrupedal animal doesn’t exist anymore while the exact bone occurs in a human skeleton... The fibula on a horse skeleton is merged together with the tibia, so that you only have one bone, but two in a human skeleton. Whenever I learn a new animal I search on the internet for that specific skeleton. There is always something new about a bone that I didn’t know before.”

The way that muscles work for different animals can greatly affect the overall look, too. “One of the most important things I learned about

“If you already know human anatomy, it is easier to learn the muscles of an animal”



muscles is to first understand what purpose the muscle has and how that muscle works together with other muscles in order to make an animal move," says Camehl. "Another thing I learned while doing animal studies was to always keep the shape of the muscle in mind. Some muscles are thin and long, others look like a diamond shape."

A constant referral to reference imagery is beneficial and it's a key part of the modelling process for wildlife 3D artist Alessandro Mastronardi: "The best practice is using several reference images as image planes: these will help to quickly shape the model in ZBrush and trace out main contours. Before delving into sculpting, make sure you have a decent collection of Alpha brushes: for my elephants, there are already several available at ZBrushCentral. I created and used my own ones with Photoshop and Filterforge to give better details along the limbs. While working with high-poly meshes it's very useful to use AO or Cavity masks to isolate and sculpt specific areas and have tiny details to emerge, such as wrinkles, folds and imperfections that make the model more believable."



ANATOMICALLY ACCURATE ART

As associate artist at Zoological Society of London (ZSL), Tim Pond gets lucrative, first-hand, on-scene observations of animals that he draws

3DArtist: What kinds of references do you use for your illustrations?

Pond: We can learn from the Italian and German Renaissance artists who drew animals, such as Leonardo Da Vinci and Dürer. Later on in the 17th Century, Rembrandt was still applying anatomical knowledge to sketching animals – [as were] more contemporary artists, such as George Stubbs and Degas. I print out and stick to pieces of cardboard samples of their work to refer to, particularly while working up studio illustration, where my primary references are photographs.

The books I rely on are *Animal Anatomy For Artists* by Eliot Goldfinger, which is an outstanding reference book with a high level of scientific rigour. *The Laws Guide To Nature Drawing And Journaling* is very accessible and full of helpful tips. Both books are equally important.

3DArtist: What makes sketching on the spot better than drawing from reference photos?

Pond: One of the challenges of the 3D artist is to capture the heft – the feeling of the weight of the animal, its visceral physicality. Drawing directly from the animal introduces the artist not just to the individual personality of the animal, but also characteristic behaviours that the species exhibits. It will also allow the artist to get to know on a far deeper level the nuances and subtleties than a flat photograph can offer.

Sketching wildlife from life is a unique and richly rewarding experience. It is also highly challenging; at times you only have a matter of seconds to capture gestures in movement.

3DArtist: How do you make sure your animal illustrations are anatomically accurate?

Pond: As an artist we do not need to know anatomy on a veterinary level. There are muscles

that I think of as friends, the ones that you are most in contact with. These are, generally, the big ones. Some of these muscles are flexors, which force the joint to flex or bend. The others are extensors, which straighten the limb. A bicep is a flexor and the triceps are extensors.

I think of anatomy as structure and swellings; bones and muscles. The muscles, which act like elastic bands, attach themselves to important fixture points, such as the trapezius muscle to the elbow. The trapezius is bigger on a quadruped.

There are three basic foot postures in quadruped mammals and it is important to

identify at an early stage whether the animal is walking on the sole of its foot, such as a bear or human, its toes, such as a predator like a lion, or its toenails, such as a deer.

3DArtist: How has your work with ZSL given your illustrations another level of accuracy?

Pond: ZSL has a history of appreciating the value of

natural history illustration and the value it can play in conservation. My involvement with ZSL has enabled me to develop my artistic practice. Access to be able to sketch the animals and enjoyable chats with scientists with their endless enthusiasm is inspirational.

The veterinary staff at Royal Veterinary College have been fantastic in giving advice on a comparative anatomy system I am developing for artists, a stripped-down simple system that gets artists thinking about bones and muscles. I am hugely indebted to their time and enthusiasm.

The Royal Veterinary College would like to invite readers to attend their Animal Anatomy Art classes in London. You can sign up on EventBrite: bit.ly/2cFH49N.

“Sketching wildlife from life is a unique and rewarding experience. It is also highly challenging”

SCALES, FEATHERS AND FURS, OH MY!

For lizards and fish, for example, scales are an additional part of the modelling workflow. Hand sculpting is the best method of producing unique scales and for different scale shapes and sizes.

"Most scales are floating on top of a wrinkle pattern," says CG artist Tan Bi, who uses ZBrush to do his sculpting. "I use an image stencil as a guide pattern to determine wrinkle direction and scale sizes. But for the best result, each scale is hand sculpted just like traditional sculpting on clay. For uniform scales, I sculpt the base form, then use UV textures to mask out the scales.

"Sculpting the scales of a crocodile and coelacanth requires a lot of research, because they are very organic scale sizes and the scale shapes change in different directions."

Modelling and texturing artist Jonathan Vårdstedt worked very similarly for his chameleon render. "I hand sculpt them using Sculpt, Smooth, Pinch and Lift brushes," he explains. "After that I can easily bake a Cavity or Thickness map from my hi-res mesh to mask the scale sockets so that I can paint the scales without having to worry about painting in the sockets and only on top of the scales. The texturing is mostly done by hand, but I'm also projecting different details here and there with a grunge map."

Grooming hair and fur for mammals, on the other hand, can be an arduous, but ultimately rewarding process for Mastronadi. "Practice is your best friend when styling hair and fur, so I

never stop until I'm really satisfied and I always apply several poses to the model to groom hairs further and achieve the best style in any pose.

"Hair flow and partitioning are key factors in my pipeline as they help to understand how to groom and organise hairs later... I also create two additional Shave groups to add more density and detail to tails and ears. Dividing hairs into separate groups is essential in my pipeline – it helps to keep everything organised and focused on each part."

Hair and fur TD Gabriela Salmeron is no stranger to the painstaking work involved either:

"Each curve that guides the fur strands is placed and combed one at a time. Several attributes,

expressions and texture maps are created to control most of the parameters such as density and length." It's an extensive system that requires "additional fur layers used to control areas that have very different-looking fur, or to scatter some messy strands to break the silhouette." For Salmeron, clumping is an important attribute for creating fur, with small areas like paws and eyes needing special attention and a higher number of guide curves to drive the strands correctly. "I tend to create a nodal system that allows flexibility for further changes in a fast and easy way, sometimes using global variables to make fine adjustments in a cached fur."

"When realistic animals are being created, it is important to add imperfections and variation [in

the fur]. I add a random direction bend, varying in strength, to a percentage of strands to achieve this effect. Procedural colour variations in the shader, even when using textures, also help make it more realistic, like adding some white hairs." Salmeron has a very recognisable style that translates into a cartoon look quite easily, and she reveals that this is thanks to how similar grooming stylised fur is to creating realistic fur in terms of the basic node structure. "Stylised animals have a very defined silhouette, which needs to be preserved or enhanced through the fine control of the clumping and just a soft touch of randomness."

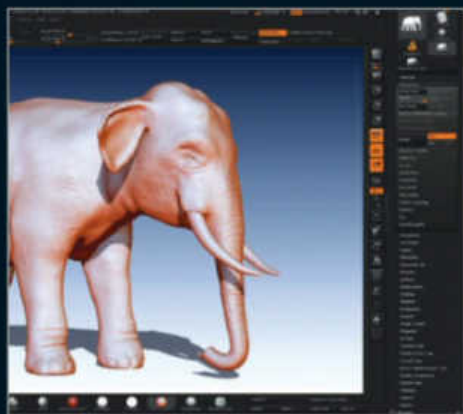
Salmeron's weapon of choice for fur is Maya and the plugin Yeti, which allows the artist to control and combine several parameters such as density, length, clumping and width through texture maps or custom attributes. She also uses Yeti for the creation of feathers to manage the variation in feather length,

strands, barb direction and tearing. Like fur and scales, feathers need to be individually generated and shaped depending on where on the body the feather will be located. "Feathers of the tip of the wing are usually thinner at one side and longer, while body feathers are larger, shorter with spread barbs," advises Salmeron. "Around three textures for almost each feather shape are created and combined with procedural noise patterns to achieve colour variation. Combining all these factors, each feather becomes practically unique."

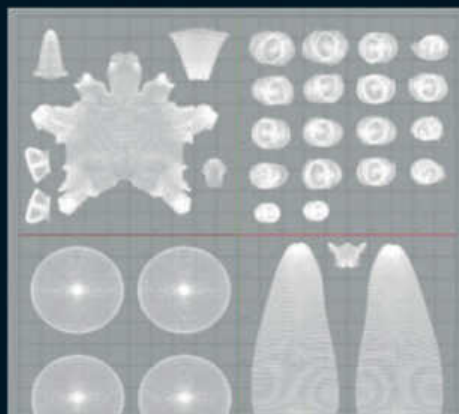
“Like fur and scales, feathers need to be individually generated and shaped”

RIG AN ELEPHANT

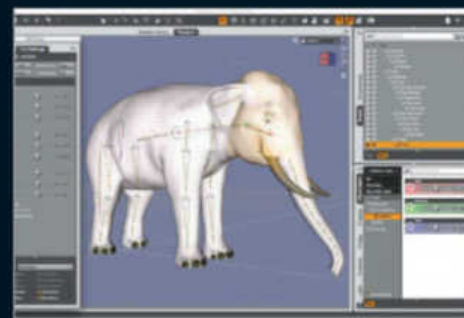
Wildlife 3D artist and model creator Alessandro Mastronadi teaches us how to rig a mammal and get it ready for posing



01 Extract low poly In my pipeline, once the high-definition model is finalised in ZBrush, I extract a low-polygon version. I then retopologise the geometry in MODO, creating the UV maps and defining polygon groups for each body part.



02 Match poly group with anatomy It's very important for each polygon group to match the anatomy and skeleton diagram of the animal correctly, so that joints will bend correctly and the posing will look natural.



03 Create a bone for each group DAZ Studio offers great tools for joint definition and Weight Mapping. The first step is to create a digital bone for each polygon group: starting from the hip I proceed to follow the skeleton structure, laying joints for the tail, limbs, torso and head groups. Remember that the digital bone (or joint) name must match the polygon group name.



Sightseeing With Mommy, by Alessandro Mastronardi



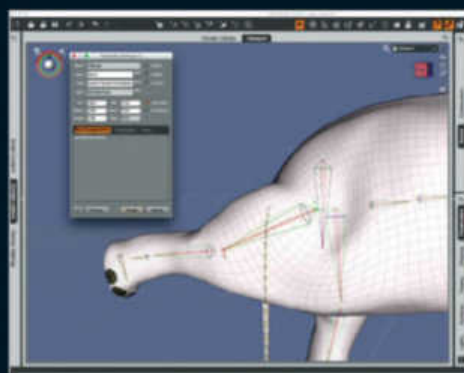
The Bronze Cast Of Tuatara, by Tan Bi. Displayed at San Francisco Zoo



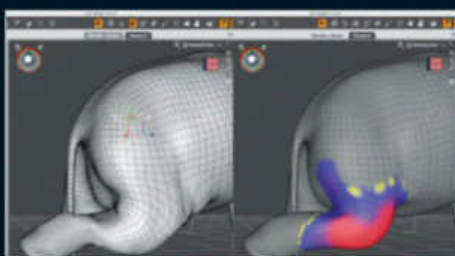
Chameleon, by Jonathan Vårdstedt



Bird - HAVAIANAS Princessas by Gabriela Salmeron



04 Edit joints With this in mind I edit each joint on the right-hand side and the torso, tail and head section, setting the bend, side and twist limits to mimic how those behave in real life. Mirror the structure onto the left side and we are ready to Weight Map the model!



05 Use Weight Mapping If you try to bend a leg or twist the torso you will notice a lot of distortion and abrupt transitions. Weight Mapping will smooth things out for us. Iterate each joint rotation and use the Weight Map brush tool to add, remove or smooth out polygons, finely tuning the influence of each rotation, and keeping polygon stretching to a minimum. I often define Bulge Weight Maps too, which help to circumscribe and enhance or reduce bending effects.



06 Apply poses The Weight Mapping procedure can be mirrored to the opposite axis. Always double-check and make sure to apply several poses to validate joint rotations and polygon flow behaviour. For specific models or critical areas where Weight Mapping alone won't suffice, you will find Joint Controlled Morphs extremely useful: you can export the posed mesh and create a finely-tuned morph in your 3D software, load it back in DAZ Studio and associate it to the joint rotation.

SEE WILDLIFE RENDERS IN A NEW LIGHT

For senior lighting and rendering artist Volkan Kacar, the lighting process is his favourite part of creating a believable animal render because "it's the part [when] I'm closest to finalising the work." Kacar explains that to create natural lighting for your animals, the easiest method is to use HDRIs, and for the *Frog Brothers* render that he created with 3D artist Sedat Aciklar, this was even more true: "The most important reason for [using an HDRI] is that we needed it to look realistic. HDRIs give us a very good reflection and we thought this was the best option."

To quicken the process further, Kacar and Aciklar used OctaneRender because it's an unbiased render engine and uses the GPU to render. "It gives the opportunity to see real-time results on the process," he says. It's a renderer that Eric Keller is keen on using as well to make even more compelling images while saving on render time.

An eager experimenter, Keller has been exploring the use of real-time game engine rendering and GPU rendering in his work. "I'm spending a lot of time learning Unreal, which is where I think the future lies. Game technologies

such as Unreal and Unity are now very affordable. There are plenty of great tutorials for this software, I can still incorporate my ZBrush and Maya workflow, and the best part? No render time."

But just speeding up rendering isn't enough for Keller, as he is trying to learn and incorporate other less traditional tools for creating renders, such as Redshift, Substance Painter, Substance Designer and the dev kit for the VR headset HTC Vive. "I would like to get more realistic materials, better lighting and translucency out of game rendering. It seems like the technology is advancing extremely rapidly, so this will be achievable in the near future. There are so many examples of artists producing near-photoreal imagery using real-time game rendering these days that it seems like a step backwards to use software rendering. It's only a matter of time and practice before I can get an image out of Unreal Engine that looks every bit as good as something rendered in OctaneRender or in Arnold."

As Keller's work is involving newer and newer tools, his insect and animal renders are only set to evolve with each new software or tech release. His next goal is to get his insects into a virtual reality project: "Artists have so many choices now compared to just a few years ago, that you can make whichever software you enjoy using work for you. As virtual and augmented reality become more mainstream, things are going to get even more interesting."



Big Head Fly,
by Eric Keller



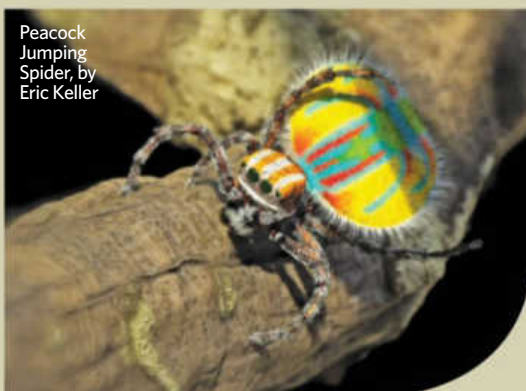
Bee, by Tomasz
Wyszolmirski and
Monika Olizarowicz



Frog Brothers,
by Volkan
Kacar and
Sedat Aciklar



Tree Frog,
by Eric Keller



Peacock
Jumping
Spider, by
Eric Keller



BE A PHOTOGRAPHY COPYCAT



Wildlife photographer Tim Hunt gives us his top tips for creating animal photography-style effects in 3D

"Sometimes photographs can be too good to be true," begins wildlife photographer Tim Hunt on the differences between doctored photos and natural captures. "The 'perfect' photograph can appear clinical, where colour and lighting can almost appear better than real life." Indeed, these perfections ring true for 3D renders too, where imperfections – whether in lighting, composition or even the animal model itself – will look more real than a 'perfect' render.

Even with a passion for wildlife photography, Hunt has encountered 3D imagery of nature before. It's interesting, then, that the common post-production techniques that 3D artists employ when creating photorealism are, to him, the antithesis of creating a good photograph. "I've heard of artists adding chromatic aberration to replicate photographs. I feel that this would be unnecessary, as modern lenses produce very little CA. Photo-editing software is capable of completely eliminating CA, too."

What he recommends is for 3D artists to observe imperfections and lighting. "I would suggest analysing multiple images of the same subject and observing the variations within the species, and how different lighting might affect the textures and catch lights."

"Good lighting is essential to creating images with impact. It can add depth to an image and bring textures to life. With close-up shots of wildlife, positioning yourself or your lights in order to get catch lights (specular highlights) in the eyes of your subject will add life to your subjects and help them appear sharper. It is important to be conscious of the distance between you and the subject, as you want to avoid limiting the amount of depth of field (DOF) you have to play with."

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Design a photoreal jellyfish scene

Discover how to create a realistic jellyfish in an ocean environment using Cinema 4D, ZBrush and Photoshop

Here you will gain an overview of the production process of a complex jellyfish in 3D, which will be created in Cinema 4D, ZBrush and Photoshop. All we need is to understand the structure of this formidable creature before starting modelling, and choose the best way to complete the work quickly and efficiently.

Initial research is one of the most important steps, as it is when our mind is fed with references. It allows us to assess whether our work corresponds well with the real construction of the animal in terms of proportion, detail and colour.

One of the main difficulties that you'll encounter may be the creation of the tentacles, which will be generated with Hair in Polygonal mode, and also in the modelling of oral arms that look like a skirt and can be generated using cloth simulation or simply sculpted directly in ZBrush.

The render can also be a difficult step because in order to achieve a gelatinous appearance in a final image with large proportions, we have to optimise some shaders and find a balance between render time and realism.

The final composition and post-production in Photoshop will be essential to bring our jellyfish to life.







DANIEL SIAN
Jellyfish, 2015

Software

Cinema 4D, ZBrush,
Photoshop

Learn how to

- Work with limited resources in a commissioned project
- Simplify processes to save time in ultra-large renders
- Think creatively to achieve a good result
- Build your model to match references
- Control your final composition using Multipass Render
- Set UVs cleverly
- Model procedurally using deformers
- Create tentacles using Hair
- Use clothing simulation to model an organic shape
- Take advantage of Decimation Master in ZBrush

Concept

The ocean depths hide wonderful and colourful animals that contrast with terrible and scary, dark environments. Our creature, which is a lion's mane jellyfish (*Cyanea Capillata*), is perfect for creating a render in this kind of style.

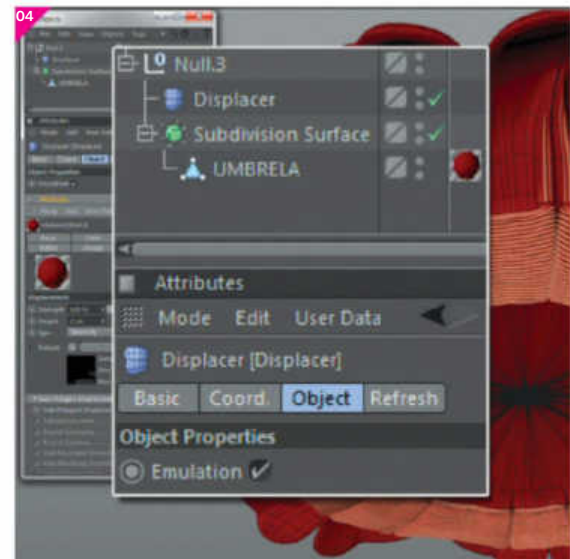
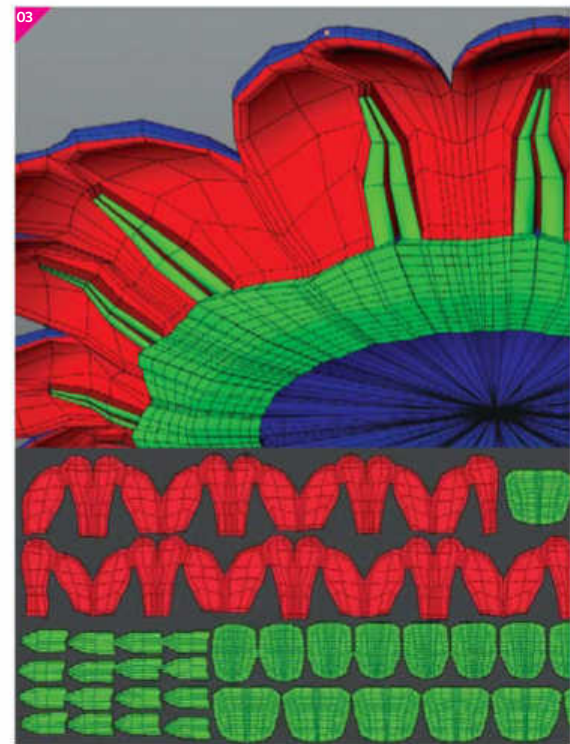


01 Learn jellyfish anatomy Do research by the scientific name (*Cyanea Capillata*) and locate images that let you view details of the jellyfish's body at various angles. Technical designs in biology textbooks are very good to serve as a starting point for further study of its anatomy. Websites of photographers that specialise in marine animals tend to have excellent images, such as www.clione.ru, which has an excellent photo as the cover of the site.

02 Start polygonal modelling Now that we understand how the structure of the umbrella is (a disc with eight identical sections), all we have to model is a half section in a Symmetry Object in Cinema 4D. Duplicate that Symmetry eight times with a Cloner in Linear mode, with Count at 8 to make a stripe. Now, use Spline Warp to deform that stripe over a circle. To be accurate, try to work with integer measures, so if half of a section is 50cm wide, after the symmetry we have a whole section of 100cm. Then, by cloning with a distance of 100cm, all sections will be precisely positioned. Now, just use Connect Object to turn everything into a single object.

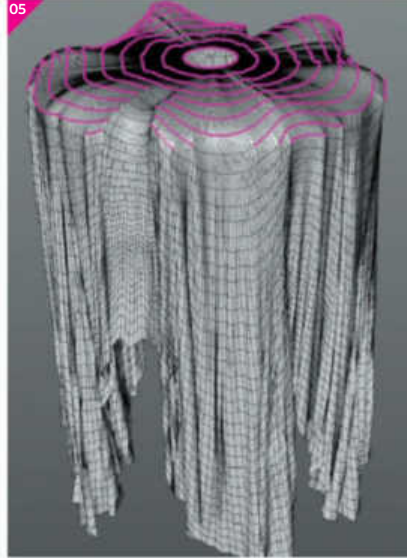
03 Make UVs Once the main shape is done it's time to set up the UVs. The best way to organise our work is saving strategic selections in Set Selection tags, which is helpful for selecting, manipulating and adjusting UVs. The green area is the region of the muscle fibres and it's important to be aligned in order to match the direction of the fibres. To align properly you can apply a material with a Tiles shader in Line mode to the Color channel. This will help you to see how the fibres will work.

04 Procedural modelling For modelling the fibres we will use an interesting technique, which can be used for a lot of other things. Just make a blurred mask texture of the fibre area and apply as a mask in a Fusion shader in the Displacement channel with low Height. Create a Tiles shader (with small Global scale and Lines1 pattern) in the Blend Channel and a black Color shader in the Base Channel. Now, use a Displacer deformer (Emulation on) to generate physical displacements. Then, to see the action of the Displacer just set a high subdivision in the model, so put the deformer together with Subdivision Surface in the same hierarchy.



Detailing the tentacles

The tentacles require extra-special care because they are responsible for the animal's expression. Therefore, add a second Hair object to work separately in a special group of guides if required. Play with all the parameters and tools, and try to give a complex aspect to the Hair. To give a final touch we can use Sweep NURBS to give ourselves more flexibility when it comes to the modelling of tentacles, because the manipulation of vertices in a spline is much more efficient and accurate. Try to model some splines coiling or making loops. This makes it seem much more realistic.

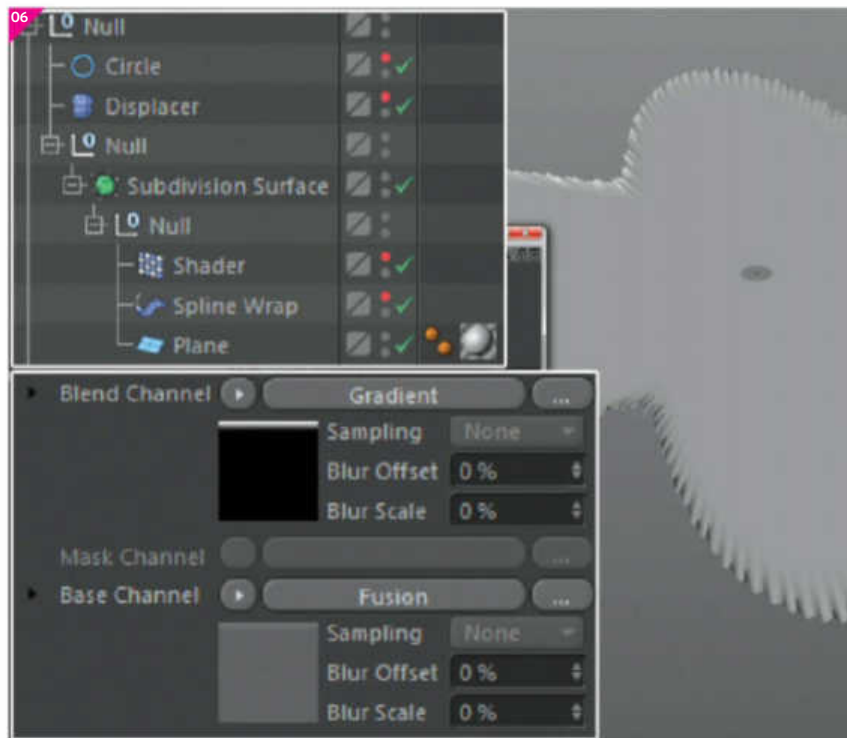


“The more subdivisions there are, the softer the folds will be, but with a heavier simulation”

05 Simulate cloth The jellyfish has four oral arms that are like a flabby tissue with wrinkled edges. We can use a plane or simply model a fabric format that has at least four corners. Because every simulation requires many tests, you can try different fabric shapes and configurations to achieve a good result. Apply a Cloth tag on the object and fix the central points in the Dresser tab. Press Play and start to adjust the parameters in the Tag tab – mainly Flexion and Interaction – and set Global Drag to 2% in the Forces tab. Don't forget that the more subdivisions there are, the softer the folds will be, but with a heavier simulation. When satisfied with the result, simply remove the Cloth tag. If you want to make improvements, make a new simulation on this result and repeat until you reach a natural model.

06 Procedural wrinkled edges If you prefer the oral arms with greater realism, you'll need to crumple the edges of the fabric, and the most efficient way to do this is by deforming the model with a Displacer deformer. As we need to deform the entire edge of the fabric evenly, we will use a Plane turned on disk, just as we did with the umbrella (with a Spline deformer). Because the Plane object has flat UVs, the wrinkles can be created with Shader tiles in the Lines1 mode – even after the simulation – as the basis of the UVs correspond with the model edges. In the image, edges are already being deformed by the Displacer only to illustrate the result, but we can do that after the simulation. It is better to have more control over wrinkles, so you will need to simulate again.

07 Prepare the model for ZBrush Once you have a good model of oral arms for the jellyfish, we must apply thickness and duplicate in order to get more volume. Use Cloth Surface to create thickness – just be careful not to make it too thick. We then have the umbrella and oral arms modelled at a high polycount, with UVs configured, ready to start the detailing in ZBrush. Basically, we will only detail the umbrella, but we need to export both to ZBrush just to simplify their topology. Use GoZ to transfer models quickly and easily.



Shader or bitmap?

The Displacer deformer is very useful because it allows us to perform procedural modelling using shaders or bitmaps. The muscle fibres could have been created with a bitmap texture, which could provide a greater realism in detail and textures. The higher the model subdivision, the more vertices will be displaced and thus the greater the resolution. On the other hand, if we use a lot of subdivisions, the model will be heavy and difficult to handle. We can use this modelling technique to create detailed base meshes in order to save time in ZBrush later.

08 Sculpt details You can go on sculpting the details in Symmetry mode. Keep in mind that the umbrella is translucent, so try to emphasise the organic structures so that they stand out in the final render. Even if the animal has subtle details in the real world, we always want to exaggerate, seeking a more artistic view, then extract some Cavity maps to help us with textures and masks. This helps bring details and gives the model more realism.

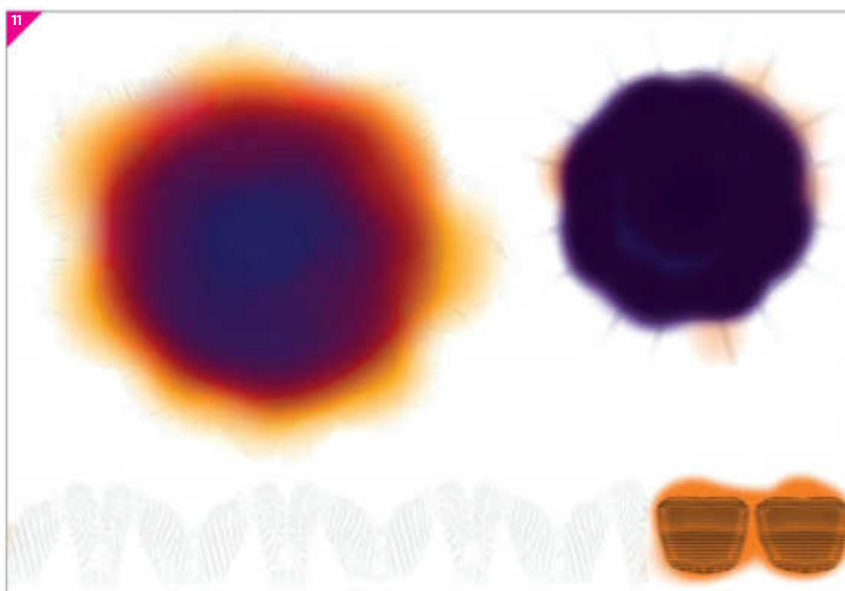
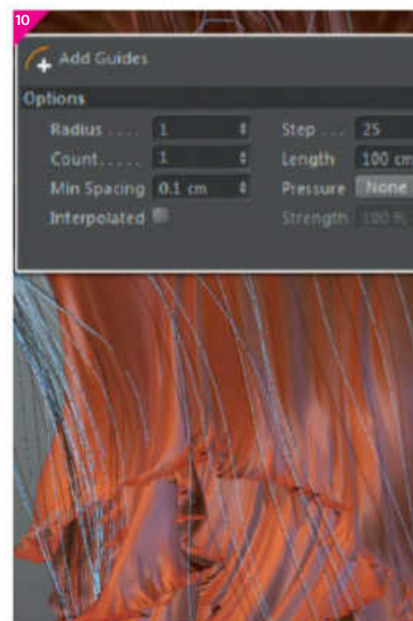
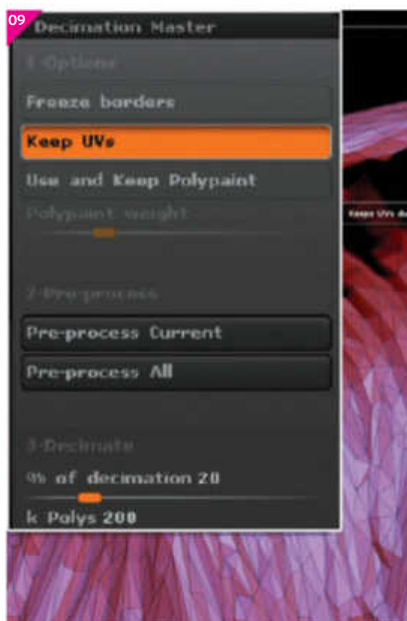
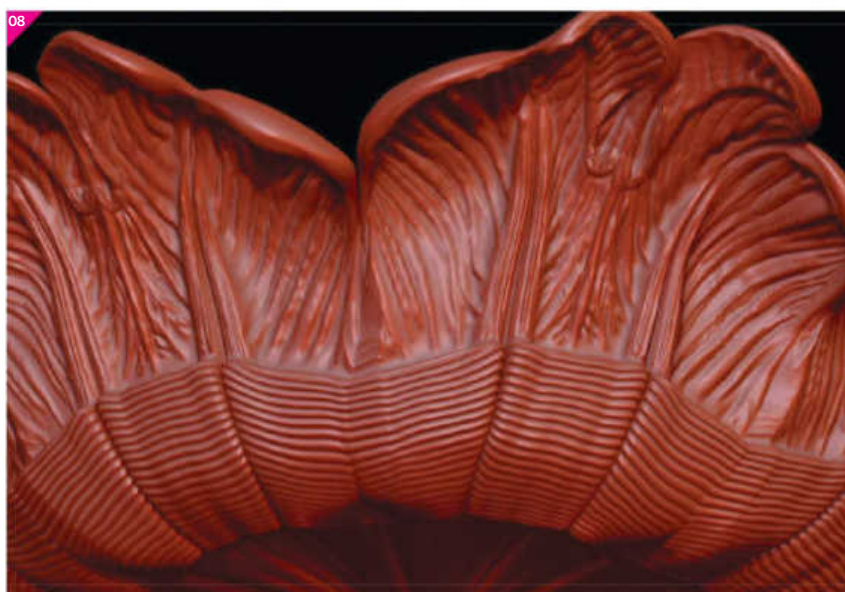
09 Use Decimation Master When satisfied with the result, use Decimation Master to simplify the model without loss of detail and textures. Don't forget to activate Keep UVs before processing, and test different percentages of Decimation to achieve a good result with enough details without making the model too heavy. This feature should only be used if there is no animation involved, as it destroys the topology and then gives you a completely chaotic mesh. Despite the unfriendly aspect, the advantages are numerous. For example, it needs no Displacement maps, Normal maps, no retopology and you keep pre-existing UVs. It speeds up the render time, and it shortens the workflow. When done, export it back into Cinema 4D via GoZ.

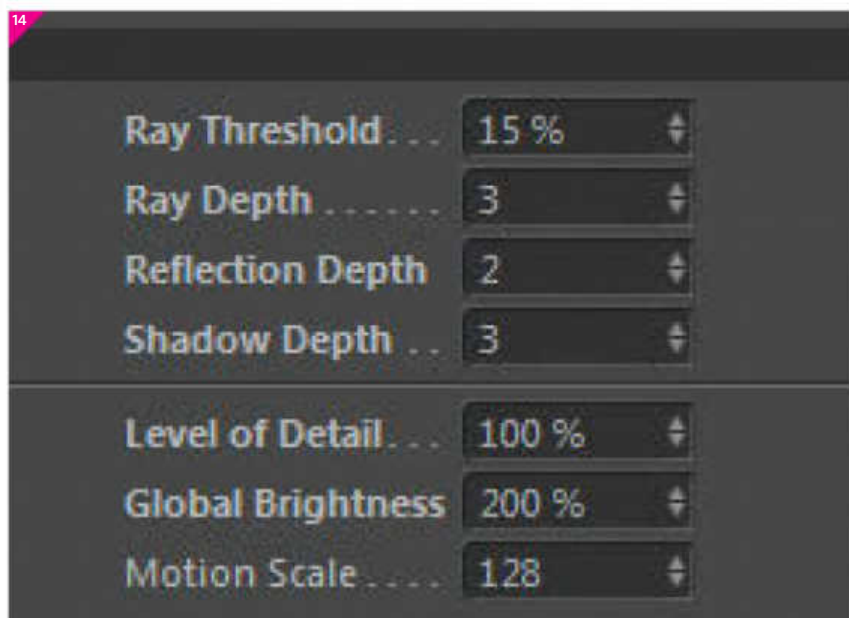
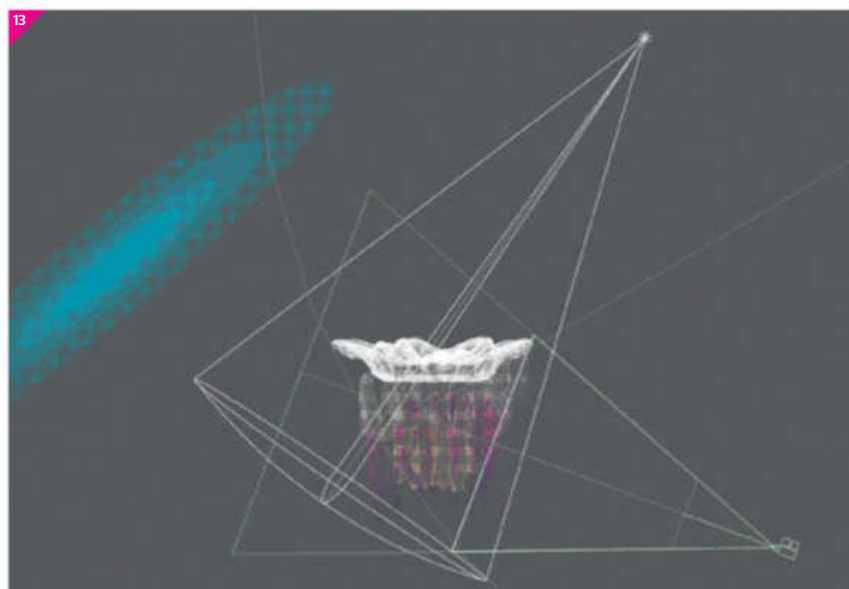
10 Create tentacles Create an empty Hair object with Root in the Custom mode and add the umbrella object in the Link field. Try a low-poly version to lighten the process and avoid slowness. Use the Add Guides tool and adjust the Radius and Count value to 1 to add guides while adjusting the length. In the Generate tab, set the Type to Circle to make polygonal hairs. Adjust the thickness of the tentacles in the Hair material. You can play with other parameters to add deformities and variations in length. Press Play to simulate gravity and then use Set As Dynamics to transfer the dynamics to the guides and then turn off Dynamics to prevent accidents. Use the Brush tool to model and Cut to decrease the size of the peripheral guides.

11 Create textures in Photoshop Use the Create UV Mesh Layer command to generate a layer with a UV map. Take this map into Photoshop and identify the islands to understand what corresponds with the model. To identify, return to BodyPaint and select the polygons in the UV canvas and see the selection on the model. In Photoshop, choose a good colour palette, and use a soft brush to add colours, creating gradients across the umbrella. Add the ZBrush Cavity map and merge in Multiply mode over the Color layer, add a Curve in Clipping Mask and control the intensity of the 'dirt'.

Low settings for high-res

The settings suggested here were used in the final render of the jellyfish at a width of 10,000 pixels. So, as we are dealing with an extremely large image, we must be aware of optimisations, and therefore adjustments in lighting and shaders need to be quite economical. If you want to increase the quality of materials, apply reflexes, enable SSS, use multiple refractions, illuminate with GI and HDRI and use area shadows. The final quality might be very good, but the render time may not fit in your budget, especially if the image is commissioned, with a tight deadline of only one week to complete.





Keep your mind fed

The composition may become the most complex stage of the work. All other steps are very technical, but require some art direction on some choices, especially in modelling and sculpture. But the composition relies solely on the creativity of the artist as only a trained eye can achieve a truly beautiful and pleasing composition, from the colour grading to opening new lights to balance the illustration. Feed your mind with references and study photography and lighting. If you know how to draw, practise digital painting – this is helpful for your growth as an artist.

12 Add shaders and colours The jellyfish has a lot of luminescence and translucency, which makes setting up shaders a delicate process. SSS is great for creating translucent surfaces, but slows down the render, and we need to get around this. Using only Single mode with Phase Function at 0.9 helps us to save processing time. Choose a cool, bright tone for Color and set Path Length to 10cm, predominantly red. Apply Fresnel blended in Screen mode on the SSS to enhance the model details. We'll also use Fresnel in the Alpha channel for transparency – avoid the Transparency channel to save on render time. Don't forget to apply a gentle bump. So far we've created the shader basis for all parts of our animal. All we need to do is modify colours and apply separately on each element.

13 Fix the lighting With the same purpose of saving render time, we will be economical with lighting so as not to require Global Illumination. We will use two lights with Shadow maps (Soft) at a Resolution of 1500. Create an Omni light and enable Ambient Illumination and set it to a low Intensity. Place it above the model to act as the sun penetrating the ocean. Create a Spot light with Intensity set to 100% and position above the model with the cone restricted to our jellyfish. Apply a blue circular disk with transparency behind the model so that the blue tint crosses the gelatinous surface and is visible in the render as a distant point of light in the dark ocean.

14 Finalise the render Keeping the same logical optimisations, we have to adjust some parameters to simplify the rendering calculation. The most important setting is in Render Settings>Options>Ray Threshold. Set it to 15% so all the rays with brightness less than 15% are ignored. Ray Depth needs to be 3, Reflection Depth 2 or 3 and Depth Shadow restricted to Depth Bounces. As we are working with minimal resources, we need to make up for some deficiencies in post-production with a Multipass. Activate all passes and start a Render to Picture Viewer to see what passes are relevant. Delete all that are irrelevant.

15 Sort the composition This is perhaps the most dangerous part, where we will rebuild the image, blending all information separately from passes and applying adjustments. We'll need masks from all parts of the model to have maximum control in the image. The PSD generated comes with all passes separated into layers, which allows us to separately edit each. Usually we use Adjustment Layers in the Clipping Mask for each pass in conjunction with masks to have specific controls. To enhance the colour, use a layer in Soft Light mode and paint with a soft brush with Flow at around 10%.



16 Add microfloating A special touch to add to our composition is to add particles floating in the jellyfish's environment, such as micro-plankton and other elements. Download the free plugin MicroFloaties Rig For Cinema 4D from www.joelotron.com. Try some settings with different sizes of particles and make at least three renders so that you can merge them in Photoshop afterwards.



17 Finalise the scene Finally we've reached the last stage of our project! All we need to do here is put the overlapping plankton in Add mode in Photoshop on our jellyfish and do some retouching if necessary. At this stage we can make global colour adjustments, contrast and sharpness. Try tweaking the depth of field to make the most charming and appealing image. The same procedure described in the tutorial has been used to produce the other two jellyfish, with some variation, while maintaining the same production line. We hope this tutorial has been helpful to your studies, and enjoy!

Showcase

Daniel Sian

A Brazilian CG artist, Daniel Sian has been internationally awarded at Cannes Lions and Clío Awards. He worked as a freelancer in Sao Paulo, Brazil, serving local and overseas clients in USA, South America, Asia and Oceania. He currently lives and works in Auckland, New Zealand.



Lovely Striped Love Beetle, 2015
Cinema 4D, Photoshop

This was modelled in C4D and rendered with Physical Render and DOF. The biggest challenge was finding the right lighting to achieve the drama I wanted to see.



The Lumberjack, 2016
Cinema 4D, ZBrush, Photoshop

This character is part of a large project with three illustrations that show that when your voice fails, you may be in danger. Render, SSS and Hair made with Physical Render.



The Owl, 2016
Cinema 4D, ZBrush, Photoshop

This owl watches on, startled at the abduction of a boy scout, who tries to call his sleeping friends, but his voice is failing. Rendering done in Physical Render.

"Megascans has become an indispensable resource for MPC artists
when building photorealistic environments."

- Damien Fagnou, CTO, **MPC Film**



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TOM BRAMALL
Sci-fi Pilot, 2016

Software

Substance Painter

Learn how to

- Create stunning textures with Substance Painter
- Approach texturing methodically
- Critically analyse and re-create real world materials
- Speed up your workflow

Concept

I created this piece because I wanted to do something that would challenge all my abilities. Concept design, sculpting, texturing, all the way through to the final, game-ready model.



Texture a sci-fi character

Make the most of Substance Painter to create industry-standard textures and emulate real-world materials for a dynamic character scene

Texturing is one of the most important and sometimes overlooked aspects of 3D art. It is especially important for games, where textures can make or break the look of a low-poly model. Substance Painter has quickly risen to become an invaluable asset in the 3D texturing pipeline and a formidable alternative to traditional texturing in Photoshop. With its vast array of tools and intuitive painting features it's a must-have for any 3D artist these days.

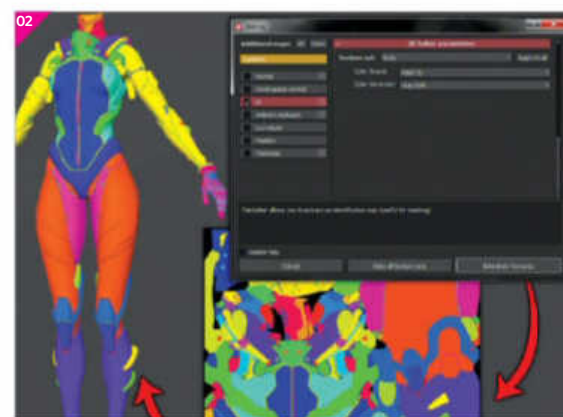
In this tutorial we'll be looking at how you can use Substance Painter to quickly and efficiently create amazing PBR textures for your models. We will be breaking down my own personal thought process for texturing step by step and see how Substance Painter was used to create the textures for the suit of this sci-fi pilot. We'll go in depth on how the various features of Painter work and how to get the most from them, as well as show you how working smart with Painter's artist-friendly tools can speed up your workflow dramatically. This tutorial is suitable for a beginner, but assumes a basic level of knowledge of the tools given to you. If you're unfamiliar with Substance Painter I recommend reading up on the online documentation before diving straight in!

01 Plan your texture Dedicating time to planning what you want to achieve early on can save you from wasting valuable time getting stuck and not knowing what to do next at a later stage. If you're not working from a concept or you don't have a clear idea of what you want, you may find it useful to experiment on a clean grey render of your high-poly model before starting. Just some simple modifications in Photoshop – planning out colour palettes and material looks you'd like to achieve can make things much easier later. For me, personally, this is a vital step and not one to be overlooked.



02 Prepare your maps Along with the typical maps that Painter needs (Normals, Cavity, AO and so on), one map to ensure you bake is an ID map, also known as the Clown Pass. Substance Painter itself has excellent baking tools, which can generate this texture either by reading vertex colours provided by ZBrush or by randomly colouring each element of your high-poly mesh. Choose which option best suits your project. This map will be used extensively in this tutorial to mask areas of your model in line with its sculpted details (saving huge amounts of time), so it's very important to have!

03 Work smart, not hard Giving unique material IDs to areas of your model before exporting will separate them into different TextureSets when importing into Substance Painter. This is an effective way to isolate areas that overlap or would otherwise be quite hard to paint. The drawback to TextureSets is that when you have several of them filled with layers, it can become quite resource-intensive. If your computer is not very powerful, you may consider splitting the mesh and texturing each piece individually in its own project. Any work you do can be saved out as a Smart Material, which can be quickly transferred between groups or projects, so either method is fine.

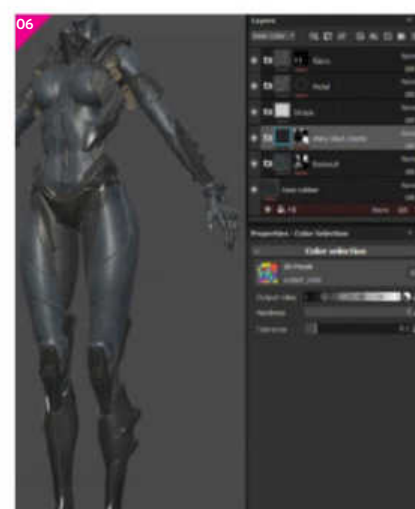


04 Build a layer workflow Layers in Painter don't work how you would expect them to work from a Photoshop-style background. A layer can be directly painted into, but it is more commonly used as a miniature group for holding layer effects. For example, a fill effect will flood the entire layer with a colour, texture or Substance material, affecting colour, Roughness, Metalness and Height channels as you specify. You can also add blur, sharpen or even levels filters directly into a layer. The same rules apply for masks. Look at the Smart Materials and Masks that ship with Painter to see examples of how these effects can be used and combined.

05 Create convincing base materials Before getting into any hand-authored painting, one of the most important steps in creating a great texture is making believable base materials. Painter's built-in Materials and Smart Materials libraries can be extremely useful in creating these. Experiment with the Metalness, Roughness and colour values of existing materials and you'll find you can adapt them to almost any role. During this early stage it's also critical to use good references to make sure you capture the look of the material you're aiming to re-create. For this model my personal set of motorcycle leathers was used. Pictures are great, but you can't beat the real thing!

06 Mask Here's where that ID map comes in! We'll be using it to allocate the materials we've made to specific areas of our mesh. Start by Ctrl/right-clicking on a layer and hitting Add Black Mask – the material should disappear. Then, Ctrl/right-click on the mask and select Mask By ID. This allows us to use the ID map we created in Step 1 to quickly choose areas of colour for our materials to fill without needing to paint the mask ourselves. This saves huge amounts of time over painting masks manually. Do this with all your materials until your model is completely covered – this is a good base from which we'll begin detailing.

07 Weather using Smart Masks Smart Masks are a great way to quickly add basic wear and tear to your materials. An example of this would be automatically generated scratches at the corners and edges of your model, where a reflective metal base could shine through from underneath. To use a Smart Mask, simply drag and drop it on to a layer. Be sure to play with the settings and move away from the cookie cutter default appearance. You can also try stacking multiple on top of each other, using layer styles to blend them. Aim to re-create what you see in your references.



Using multiple ID masks

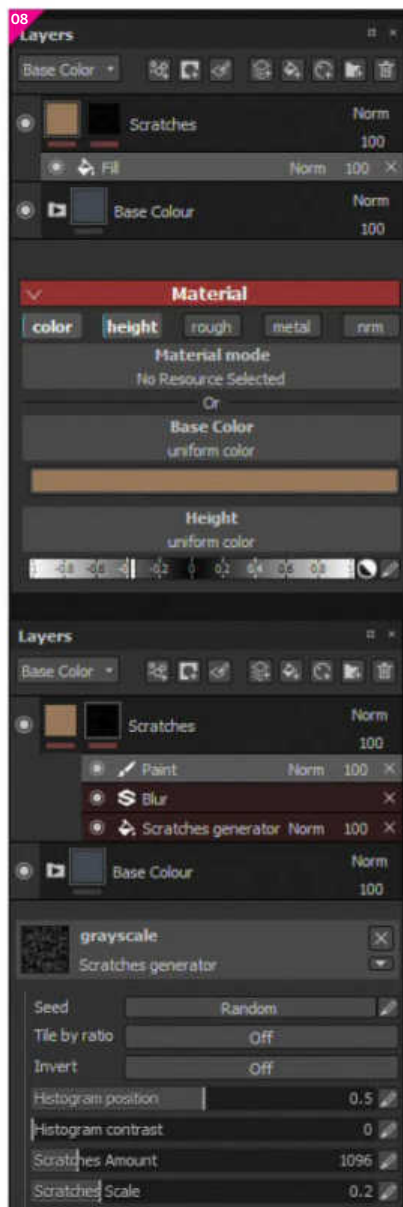
ID masks, while powerful, can get quite fiddly and inaccurate when the colours in your ID map are very similar. If your ID mask is bleeding into a colour you didn't intend and you can't seem to fix it with the Tolerance sliders, there's a quick workaround. Add a second ID mask on top and check the Invert option. Set the Tolerances to be extremely strict and use this to fix any colour bleed. You can keep adding more ID masks on top with varying Tolerances and colour picks until all the unwanted areas are gone. This can get somewhat tedious, but it still beats manually painting masks for speed.





“It’s critical to use good references to make sure you capture the look of the material you’re aiming to re-create.”





“ If you need more dirt, simply increase the opacity of the colour, but remember that subtlety is key ”

08 Create advanced custom masks You can get advanced with masks by incorporating textures, custom generators and manual painting – you could even try masking your mask! To create the subtle scratches seen in the leather of this suit, first add a new layer above the base leather and fill it with a light-brown colour with negative height. Add a black mask and then add a Scratches generator. On top of this add a Mask Builder to exclude all the deep areas (where scratches are less likely to damage), then add a blur effect to soften the scratches slightly. Finally, add a paint effect on top and use the ‘Dirt 2’ brush to manually paint out some areas to break up the uniformity.

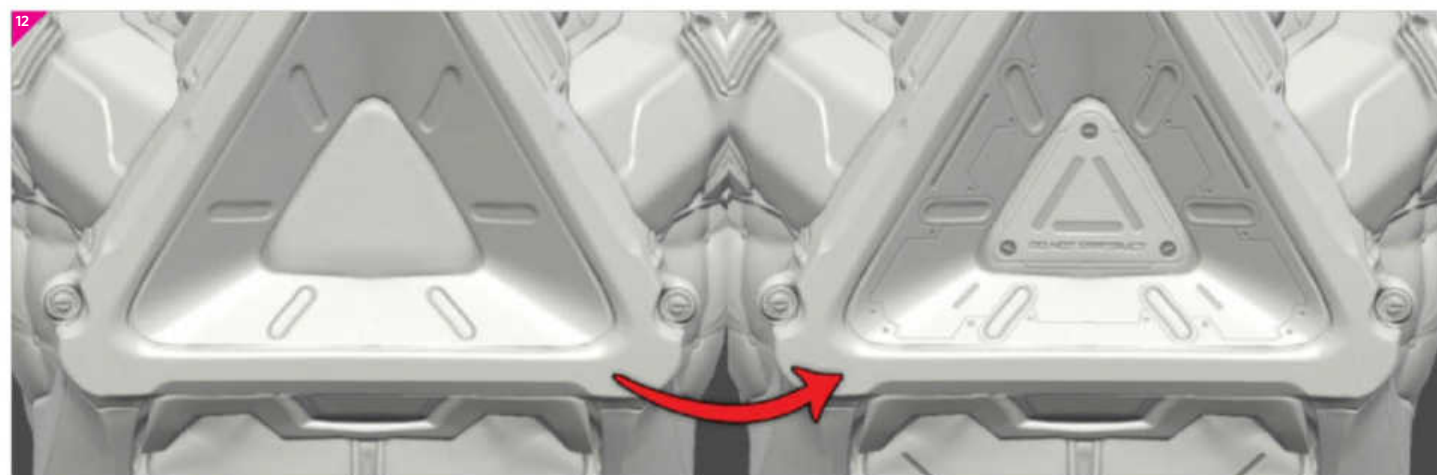
09 Material variation One or two accent colours work well, but use too many and you’re going to make your texture too busy. One technique we can use to add variation without using lots of colours is to duplicate existing layers and change their values slightly. Create some areas in your model with a different Roughness or Metalness value, or perhaps a slightly darker or brighter accent colour. You can manually paint a mask to do this or use the ID map to mask where you’d like these areas to appear. This is a very easy way to create subtle material variation that doesn’t overload your eyes.

10 Get dirty Grunge is easy to overdo, so we’ll tackle it gently. Create a layer and make it affect colour and Roughness. Fill it with brown and add a grunge texture to give it some grit. Mask this layer with a dirt Smart Mask, which will create some heavy, brown dirt in all the cracks. The trick to make it less overwhelming is to tone down the opacity of *only* the colour to 5-10% and let the Roughness do most of the work. This will affect how the light catches on the model, creating subtle disturbances in the specular and just a hint of brown. If you need more dirt, simply increase the opacity of the colour, but remember that subtlety is key!

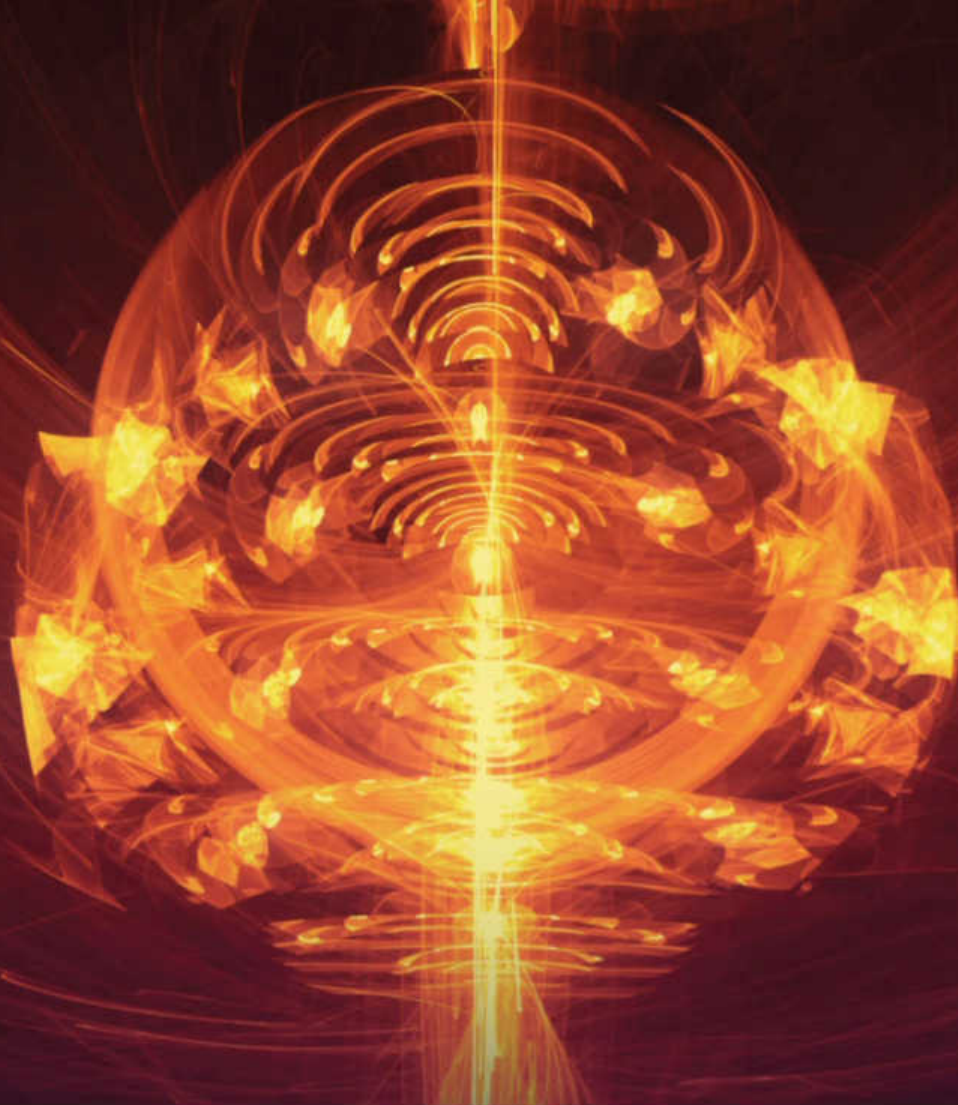


11 Manually paint details At this stage it's time to go in and hand paint extra details and grime in logical places. This will show you went the extra mile and will really help your work stand out. You can do this by either painting into your Masks or by painting into new layers. The advantage of a fresh layer is that you can set the colour, roughness and metalness values on your brush, but I find masks are typically faster because that setup is already done. The scuffs and wear on the inner thigh for example were made very simply by painting into the mask of a plastic damage layer with the Scratches and Cracks brushes.

12 Make easy panel lines Create a black layer set to Multiply. Lower the opacity to 25% and set the height to a small negative value. Mask it black so that it disappears. Now, by painting with white in the mask, you can create recessed details! You can quickly create extra detail that wasn't included in the base sculpt, which is perfect for panel lines. On this model all the embossed text and metal panelling lines on the back of the torso were created this way. It's tempting to go wild with this effect, but like the dirt, be wary of making too much visual noise.



13 Bring in the final details Decals, stickers and other personalisations are great at adding that final layer of realism and visual interest to your textures. Create a decal sheet in Photoshop with all the things you'd like to add and import that into Painter by dragging and dropping the file into the shelf. Hit '3' to enable the Stencil function, add your texture to the Color channel and it will pop into view. Use the regular camera controls to resize and position the sheet as you need it. Now wherever you paint, it will transfer the texture from the decal sheet to your currently selected layer.



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Midge Sinnaeve
themantissa.net



Midge is a 3D artist and educator from Belgium, specialising in photogrammetry, shading and lighting

Blender

Sami Tarvainen
samitarvainen.com



Sami is a 2D/3D artist who likes to play games and make them. He is currently working on his third game

ZBrush

Matteo Stella
starlord.artstation.com



Matteo is a 3D artist who loves to make videogames and is always looking for more inspiration

BLENDER



Build your own epic superhero movie titles

Over the next few steps, we'll take you through creating superhero movie titling in Blender. Using the Text tool to create the text itself, we'll go over shading, lighting and rendering. The final portion of the tutorial can be found in the files on FileSilo, where we bring our renders in to Blender's compositor and add the final touches to make it look great, using free stock footage that can be found on the internet and some basic compositing tricks. Be sure to look at the final files on FileSilo as well for reference.

01 Create the text To start, clear out the default Blender scene of any pre-existing objects by hitting the 'A' key on your keyboard (select all) followed by the 'X' key to delete them. Then, hit Shift+A to add a new object to the scene. With the Text object selected, go to the Text Options in the Properties panel. Pick a font from your system's fonts folder – we've used Agency FB Bold in this example. Change the Size to 10, set its alignment to Center in the Text Options and rotate it 90 degrees on the X axis by hitting 'R', 'X', typing 90 and hitting Return in the viewport.

02 Adjust the text With the text still selected, hit the Tab key in the viewport to edit the text. I'm using the word 'antihero', but feel free to use anything you want. Use the Extrude parameter to add depth to your Text object and the Bevel parameter to slightly round the edges of the text. Add subdivisions to the bevel to smooth it out. In the Modifiers panel, add an Edge Split modifier to the Text object to correct the smoothing on the text.

03 Double the text To space out the letters a little, increase the Letter Spacing parameter in the Text Options. With the Text object selected in the viewport, hit Shift+D to start duplicating it. Without moving your mouse cursor, hit Return to duplicate it in place. Adjust the Offset parameter of both Text objects to create a double bevelled text from both objects. Don't overdo the offset to avoid clipping. The amount of positive and negative offset you're able to use will depend on the font that you've picked. Dial down the Extrude parameter on the outside text to reveal the edges of both texts.

04 Add an Environment map Make sure your renderer is set to Blender Cycles at the top of the Blender window. In the World Properties panel, click Use Nodes and pick an Environment map. In the Environment map click Open and choose the HDR provided. I've created a smaller 2K version, which you can use if you have limited GPU memory. Be sure to set the map resolution to the size of the long length of your HDR (2048 in this case). This will help reduce fireflies in your final render. Then set your viewport to Rendered so you have a live preview of your scene. Next, we'll move on to creating the shaders on our text.

05 Start shading the text With your inside text selected, change the Timeline over to the Node Graph view and increase its size. Here we'll be creating all the shaders for our text objects. Make sure you have the Object Shading level selected at the bottom of the screen. Hit Shift+A to bring



up the Add menu in the Node Graph and select Shaders>Glossy BSDF. Connect the Glossy BSDF to the Surface input of the Material Output node and delete the unused Diffuse BSDF. Now we're ready to refine our text shader.

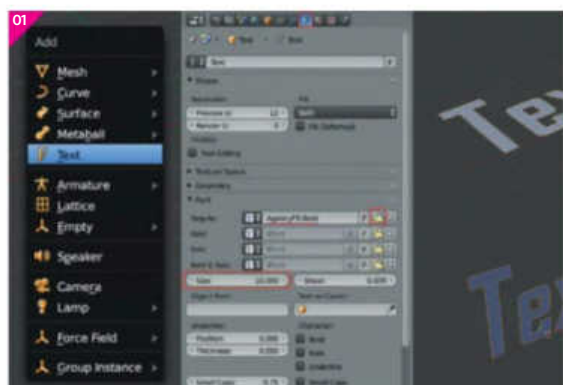
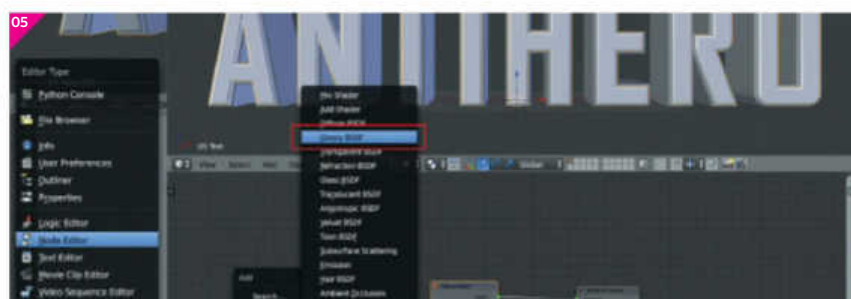
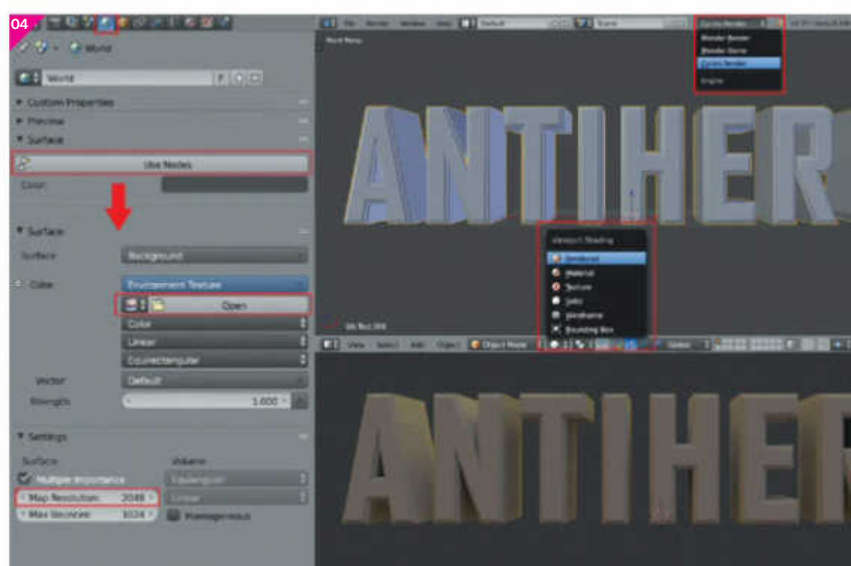
06 Refine your text shader We're going to use a Noise texture to drive both the Roughness of our Glossy BSDF and the Displacement slot of our Material Output. In the Node Graph, hit Shift+A to add a Noise texture (or go to Textures>Noise Texture). Add a Mapping node (Vector>Mapping) and connect it to the Vector input of the noise texture. Add a Texture Coordinate node (Input>Texture Coordinate) and connect the Object output to the Vector input of the Mapping node. In the Mapping node, change the X Scale to 5 and the Y Scale to 0.1. This will stretch the noise pattern to create more of a brushed metal look.

07 Continue to refine the shader Bring in a ColorRamp node (Converter>ColorRamp) and connect the Color Output of the Noise Texture to the Factor input of the ColorRamp node. Change the first colour of the ColorRamp to 0.3, 0.3, 0.3. Change the second colour to 0.1, 0.1, 0.1 and connect the colour output of the ColorRamp to the Roughness input of the Glossy BSDF node. Add a Math node (Converter>Math) and set it to Multiply. Connect the Color Output of the Noise texture to the top value input of the Math node. Then, connect the Output of the Math node to the Displacement slot of the Material Output node. The second value controls the amount of bump the glossy shader receives.

08 Finalise the shading The final touch of our shader is changing the Glossy BSDF's colour to a yellow-gold colour. We can now easily copy this shader to the outside text and change its colour to get a nice two-colour text effect. To do this, select the outside Text object, and instead of hitting the New button to create a new shader, hit the List button next to it to select the shader you previously created. Be sure the hit the '2' switch to duplicate this shader on the outside text before changing the colour to an orange-red.

Experiment with the HDR

Be sure to have a look at the included video on FileSilo, where I talk about using the HDR supplied as a tool to create interesting reflections on the letters. It's not physically correct, but with something like titling you can get away with it. After all, the look of the end result is all that counts.

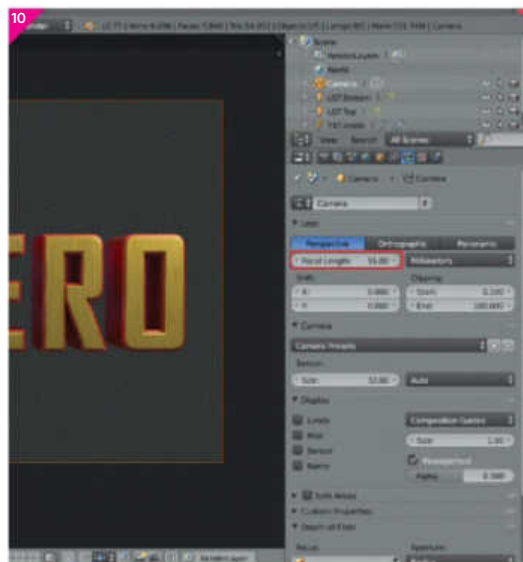
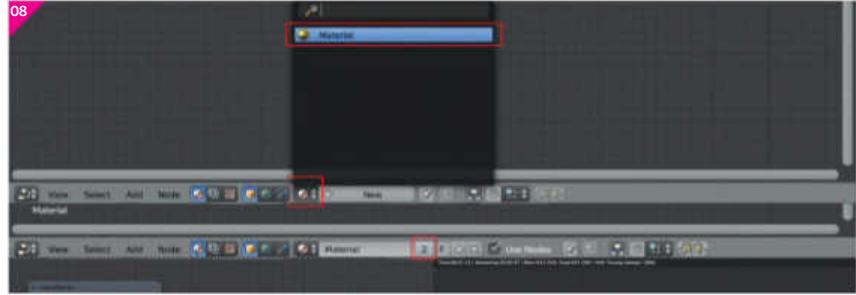


09 Add reflection highlights Switch your Node Graph view to a 3D view. This way, we keep our Rendered viewport preview running while we add some extra lights to the scene. Hit Shift+A to add an Area Light (Lamp>Area). Move the light to the top-right corner and increase its size and strength to add a highlight on the text. Repeat this step with the bottom-right corner. You can also change the colours of the lights to add more hues to the text. Keep an eye on the Rendered viewport while doing this, as this will help you get the lights in the right place more easily.

10 Add the camera Add a camera to your scene by hitting Shift+A again in the viewport and selecting Camera. Hit both '1' and '5' on your keyboard to go into an orthographic front view. While you're using this view, press Cmd/Ctrl+Opt/Alt+O. This will align the camera to the current view. Adjust the camera where necessary to move the text in to the middle of the screen. Be sure to change the focal length in the camera settings (in the Properties window) to suit your needs. I've used a focal length of 50mm in this project. In the Rendered view, hit '0' to go to the camera view.

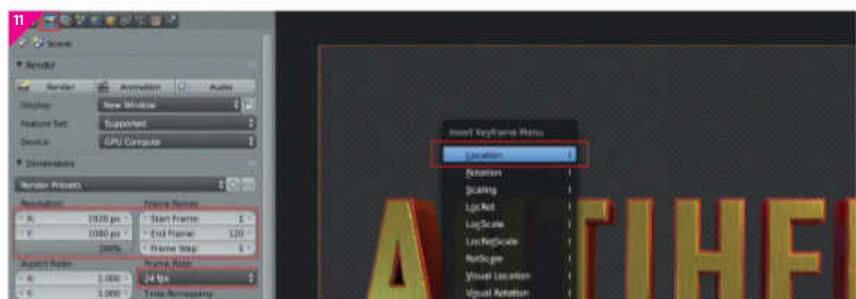
11 Add camera animation In the Render settings of the Properties panel, set up your desired resolution and animation length. With the camera selected, you can slide the camera backwards and forwards by hitting 'G' to move and the 'Z' key twice to constrain the movement to the camera's local Z axis. Hitting Shift with the left arrow key will move the playhead to the beginning of your timeline. With the camera still selected, hit the 'I' key to add a new location keyframe. Then hit Shift with the right arrow key to move to the end of the timeline. Move your camera forward and hit 'I' again to add another location keyframe.

12 Set up your render You're now ready to render your animation. You can add in any additional text or other items you like. I've added 'the' to the top of the title by duplicating the text and changing the size, bevel and extrusion. The Render settings shown in the example screenshot will give you a good starting point. Add more samples to reduce noise in the final image if needed, and don't forget to set an Output for your final images. You can always have a last look at your shaders and tweak them if necessary. I ended up bringing the Displacement Multiplier down for both text objects in order to dial back the effect slightly.



Final compositing in the video

The compositing portion of the tutorial is available in video format. Starting from a fresh Blender scene, you can apply the techniques discussed in the video to images that come from any software package. This part of the tutorial is slightly more freeform, and applies some stock footage elements to add something extra to the final look.



Technique focus

Incredible 3D artists take us behind their artwork

SCULPTING Knowing human anatomy helps to make a sculpt convincing. If you're familiar with the shapes of the bone structure, facial muscles, the fatty areas and so on, you'll get more confident in sculpting and find the right shapes easily. When I sculpt, I frequently zoom out and observe my model from a distance. It helps me to see if something is not right.



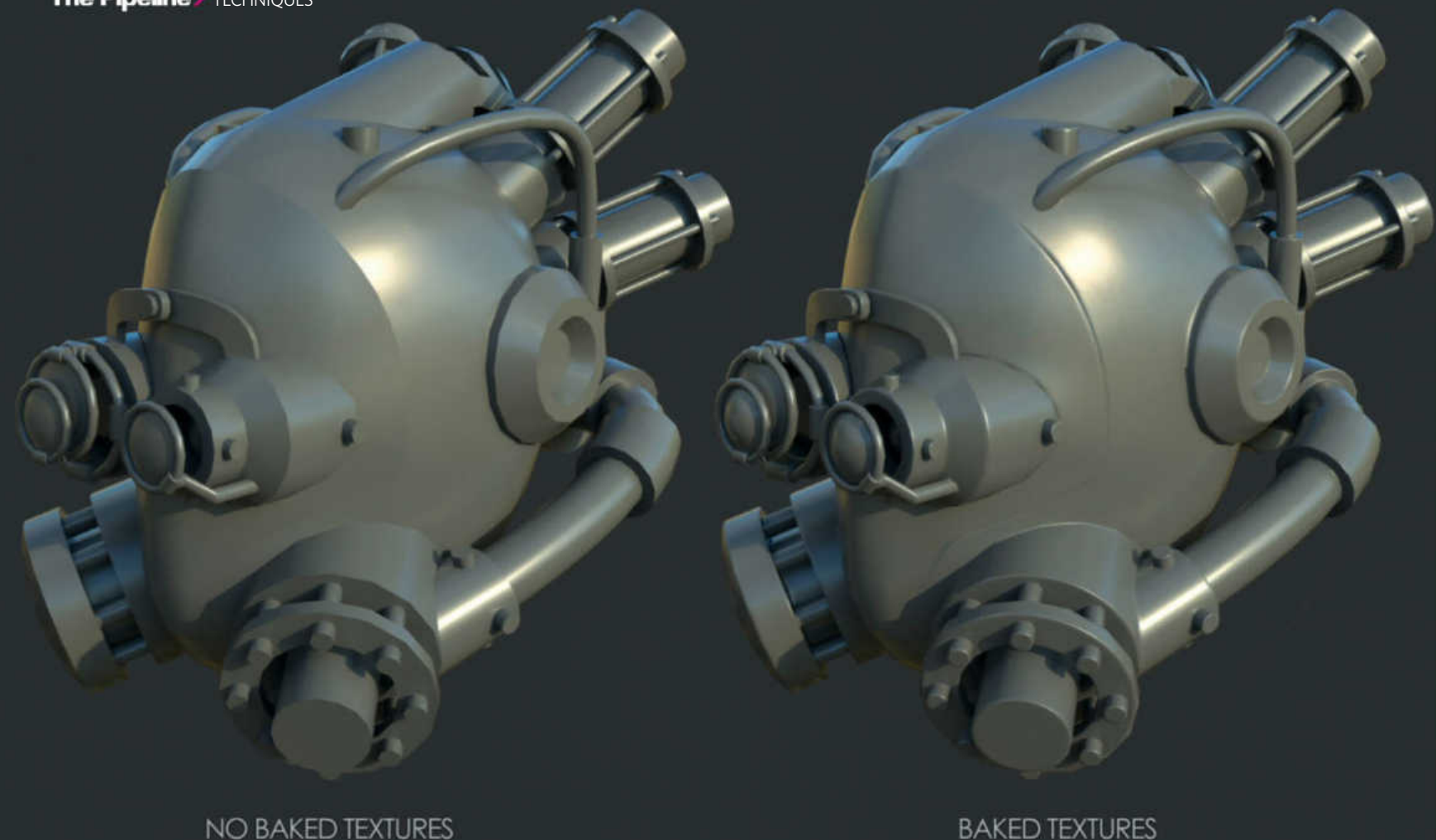
Sinan Zöngör

artstation.com/artist/zormone

Sinan discovered his passion for 3D in the Nineties. Now he works on arch vis and commercials

Software ZBrush, 3ds Max, Ornatix, V-Ray, After Effects

Sleeping Baby,
2012



NO BAKED TEXTURES

BAKED TEXTURES

BLENDER

Blender to Substance Painter texture baking

Here we'll be going over a workflow for baking textures using Blender's Subdivision Surface / Multiresolution modifier and Substance Painter's texture baking. The tutorial covers a variety of different processes, techniques and my favourite tools, so don't let the title fool you!

Because this tutorial is meant to cover the processes which come after base modelling, we'll skip the preliminary designing and the actual modelling phase and use a mask where all these things have already been done as a base for this tutorial.

I'll begin the tutorial by showing the things that I usually do before the model is ready to be converted into a high-polygon model using Blender's Subdivision / Multiresolution modifier. These will include adding additional edges to the model, useful tools and shortcuts – I know, it's a lot of edge looping. The mid-section of the tutorial is dedicated to making a low-polygon version of the model by demonstrating how to remove unnecessary edges and sharpen the edges. The last part of the tutorial is mainly about the preparation of high and low-polygon models for texture baking in Substance

Painter as well as the baking process in the software itself. We'll also learn how to export the models and what kind of settings to use for exporting.

This is an advanced tutorial, and therefore knowing the basics of Blender and the knowledge of using tools would be preferable before beginning this tutorial. Saying that, I'll try to cover as much as possible by using detailed images and describing the tools and shortcuts I use, but there will still be things that the tutorial assumes you know. I hope you enjoy reading this tutorial and – more importantly – find something helpful you can use in your future projects.

01 Set object face shading Let's start this tutorial with something rather simple and set the Object Face Shading to Smooth. Remember to have the cursor in the 3D View, then select the object, set the Object Interaction Mode to Edit (press Tab). Select all faces (press A), click the Shading / UVs tab and set the Face Shading to Smooth. If you have an Edge Split modifier active remember to disable or remove it, otherwise you won't see the results.



“I’ll add additional edges to the parts of the model that I want to maintain the original shape”

02 Add additional edges Before we move on to unwrapping the model, we’ll need to add additional edges to parts of the model that we want to maintain the original shape – this usually includes the edges and corners. The reason for this is to prevent the Subdivision Surface modifier from smoothing out the edges and distorting our UVs too much. Keep adding edges until the shading looks smooth and nothing stands out. I usually add the Subdivision Surface modifier to the model at this point so that I can see better where I need to add edges and later remove the modifier before unwrapping the model. Some useful shortcuts for this step are: Loop Cut and Slide (Cmd/Ctrl+R), Offset Edge Slide (Shift+Cmd/Ctrl+R) and the Knife tool (K).

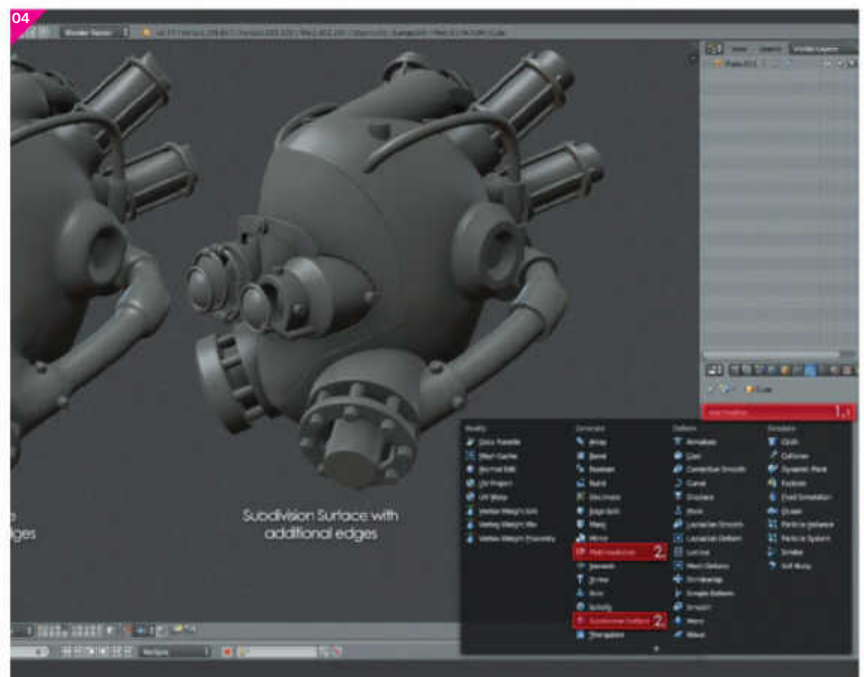
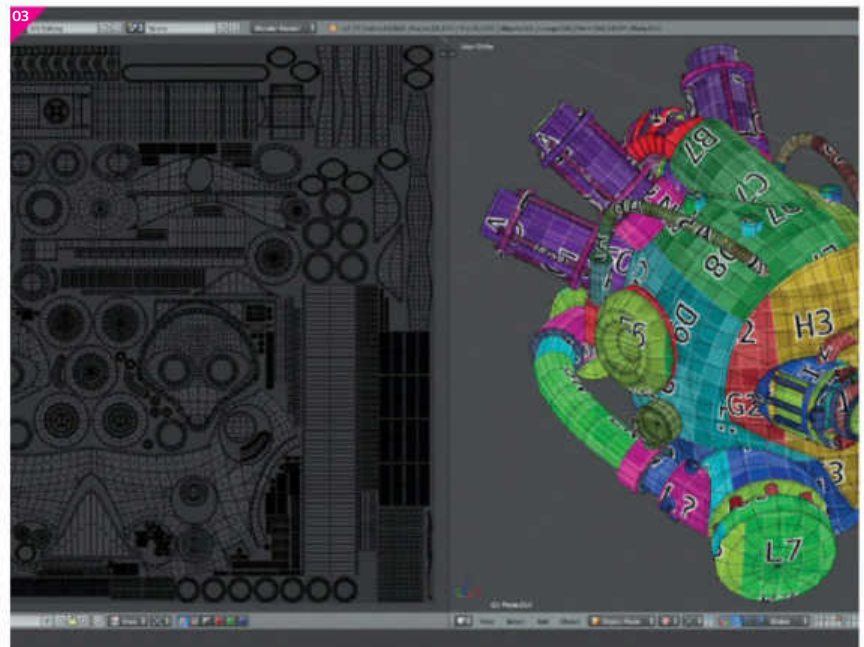
03 Unwrap the model At this point of the tutorial it’s time to unwrap the model – no tricks here, just good old-fashioned unwrapping! After unwrapping the model, make a duplicate of it. One is going to be the low-polygon model and the other is to be used for sculpting and as a high-definition model for baking textures in Substance Painter. Some useful shortcuts for this step are: Select Linked (Cmd/Ctrl+L), Select More (Cmd/Ctrl+‘+’) and Select Less (Cmd/Ctrl+‘-’).

04 Make a high-poly model Now it’s time to make the high polygon version of the model, which is going to be used as a high-definition model for texture baking in Substance Painter. For this step use one of the duplicated models that we’ve already made and then save the other one for the next step. If I need to sculpt or bake textures in Blender, I tend to use the Multiresolution modifier and if not, then the Subdivision Surface modifier will do the job just fine. If you decide that you want to use this modifier, be sure to go to Add Modifier>Subdivision Surface or Multiresolution.



Troubleshooting for possible texture issues

If you’re having issues with textures after baking – especially with Normal maps – try decreasing or increasing Max Frontal Distance / Max Rear Distance. If you find that it doesn’t help then go back to Step 7 and make that part a separate object and export the models again.



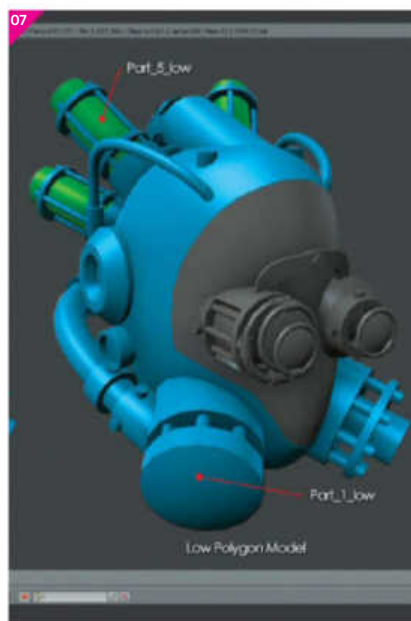
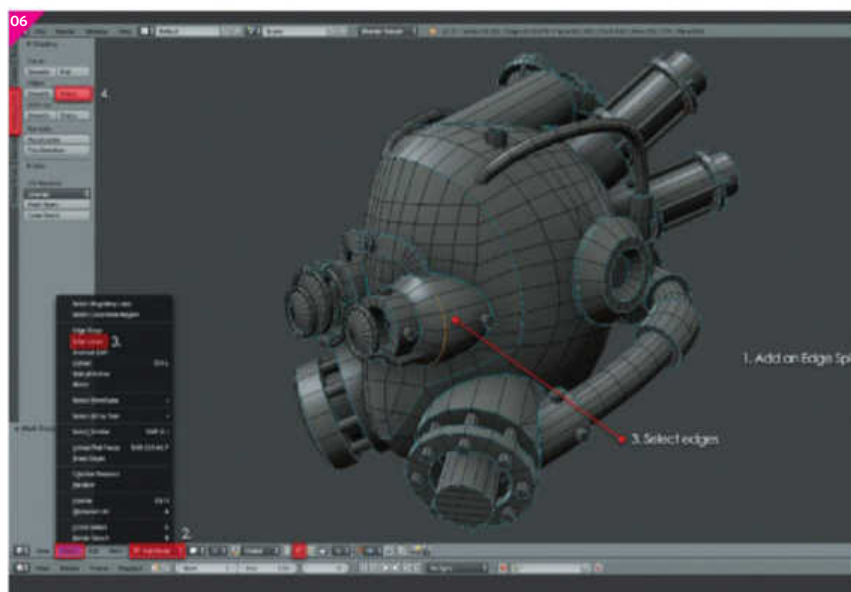
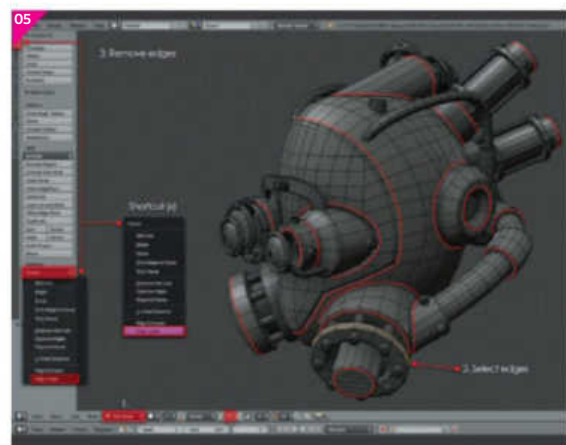
05 Remove edges for low poly For this step we'll use the model that is going to be the low-polygon model and not the one that was used in the previous step. I prefer to do this manually, but you can use the Decimate modifier as well. I usually do the removal process by selecting the edges that I wish to remove, either by using an Edge Loop selection or by hand. After selecting the edges, press X or click the Tools tab and select Delete>Edge Loops or Edge Collapse depending on the situation. In the image, the red lines indicate general areas where I usually remove edges.

06 Sharpen the edges First, add an Edge Split modifier to the object by clicking Add Modifier and selecting an Edge Split. Next, toggle Sharp Edges on. To sharpen edges, first we need to select the edges we wish to sharpen by using an Edge Loop selection or manually picking. Open the Shading/UVs tab and select Edges: Sharp.

07 Separate and name objects Before exporting objects we should separate and name them, so Substance Painter can recognise them correctly. Both low and high-polygon objects use the same name but a different suffix, so '_low' is for low-polygon objects and '_high' is for high-polygon objects. If the model is static and there's very little clipping you can export the models as single objects, but in this case the model is dynamic and there is some clipping, so to avoid possible texture issues in baking we should separate the models into smaller pieces.

08 Export and Settings To export the models, first select the low-polygon model(s). Open the File tab, select Export>FBX. As for settings, toggle selected objects on, select Mesh as the kind of object to export, click the Geometries tab and choose Face for the Smoothing. Then export the model and name it model_low.FBX. Next, do the same for the high polygon model(s) and name the file model_high.FBX.

09 Bake textures in Substance Painter This part of the tutorial is pretty simple. Start by making a new project and selecting the low-polygon model as the mesh and clicking OK. Next, click the Bake Textures button and press the small document on the Common Parameters window. Select the high-polygon model and change Match from Always to By Mesh Name. Then click the Bake Textures button and wait for the bake to complete. After that, change the Texture Mixing from Replace to Combine.



CREATE THE IMPOSSIBLE

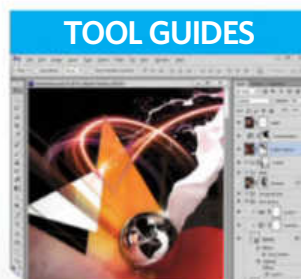
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Sculpt horns for creatures

This illustration was created as an experiment with organic materials, such as horns and teeth, and went all the way to a full illustration. I always try to improve my workflow and find new solutions and sometimes a simple experiment can become a fully fledged piece of art; I dedicate myself to workflow improvement on every single sculpt I handle. For this work I was inspired by some sketches by an illustrator named Adrian Smith – I love his man-beast hybrids! Actually, I love almost all his artistic production... I've identified that the main feature in this concept are the horns, so this tutorial will be heavily focused on them.

ZBrush is really friendly when trying to achieve shapes and design, allowing you to produce different variations in a really fast way. If you want to really mimic the look of the concept, the blockout phase is the most important: take your time on this. Study the concept and the obvious reference images – you *must* understand how the image works: in this case a humanoid head with a couple of horns inserted on the skull. Take the insertions directly from a goat skull, adapt them and you're good to go. Understanding anatomy is the only way to get the sculpt right.

This process is fundamental, because it's a sort of epiphany when you get it. The next step is putting some definition on the surfaces, so flattening parts, using some cuts to define the flow of the sculptures and so on. The fun really starts in the detailing phase – going deep into the sculpt. You'll give a stronger identity to the model adding overall details, such as scars, for example, or any detail that suggests a history for your character.

Bear in mind that it's very important not to get lost in the software at this point. Don't add too much resolution to the model, but stick to what you need. Once you get a nice-looking angry face and you are satisfied, you can push the resolution of your model to add crazy details like pores, wrinkles and so on. We'll highlight how to do this without killing your workstation. In the end we'll break up the symmetry to give a more realistic look to our model.

01 Approach the concept At this point we need to reorder our ideas to be sure of what we're going to do. Place your reference on the canvas, and with the easiest forms try to sketch the shape of the horns. Start with a DynaMesh sphere, then help yourself with the SnakeHook brush and the Move brush. You can also use a sketch shaded black to look just at shapes, making it work correctly.

02 Block out Once you've got the right shapes, start to put the overall mass all over the model. Don't forget to put the horns on a base – this can be your character's head or just a generic head from ZBrush that you can find in the Lightbox. You can still make some changes to the silhouette,

ZBRUSH



YOUR FREE DOWNLOADS
from filesilo.co.uk/3dartist

- Tutorial files
- Tutorial screenshots
- Timelapse video

because as you press on with the sculpt you will understand better what you'd like to achieve.

03 Add in macro details Now we should have the overall blockout and the right shapes, so we can start to add some details on the horns with the use of ZBrush's range of tools and brushes. The first is the Dam_Standard that you can use to start defining the main grooves. Then, with the help of the Clay_Tubes brush, you can pump the forms that you created with the Dam_Standard. Finally, using the Standard brush, you can make some peaks and valleys alongside the horns to give a more realistic look to the model and to create some variation on the surface.

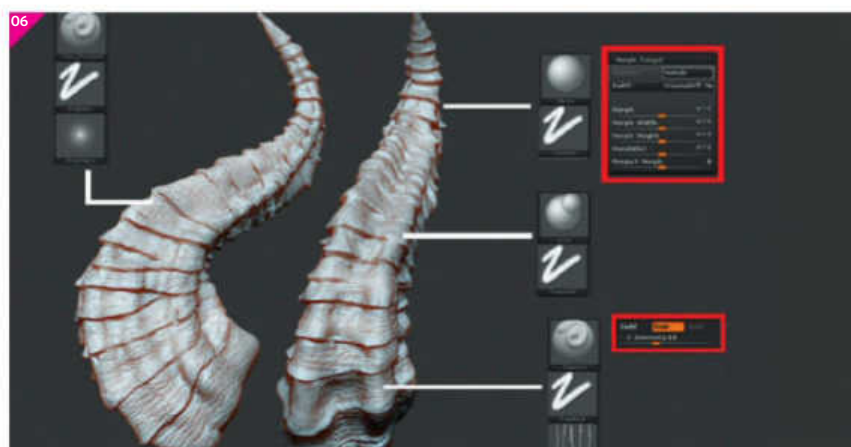
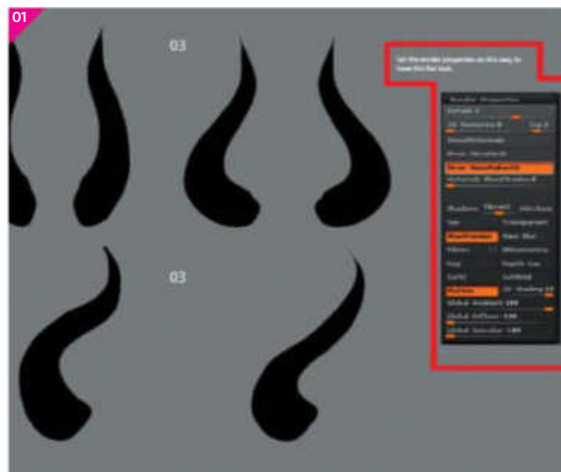
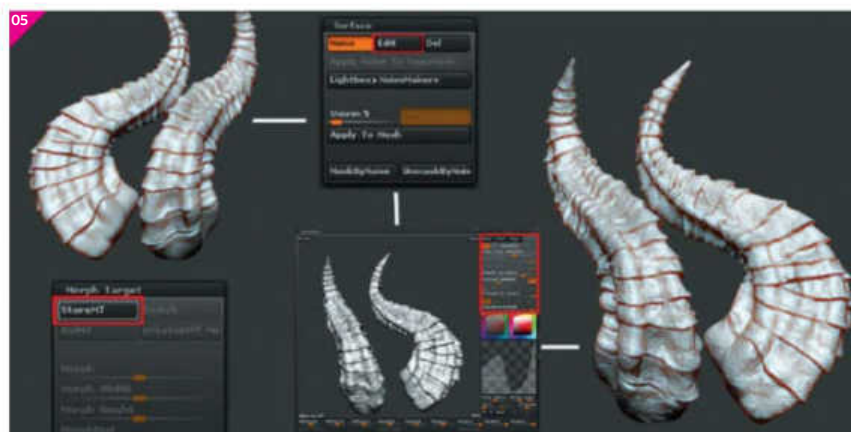
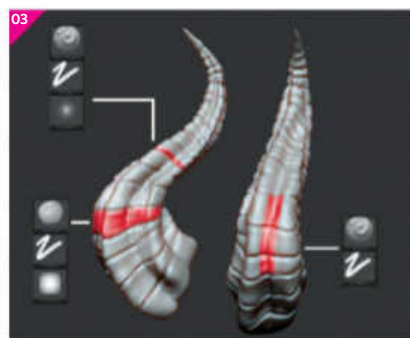
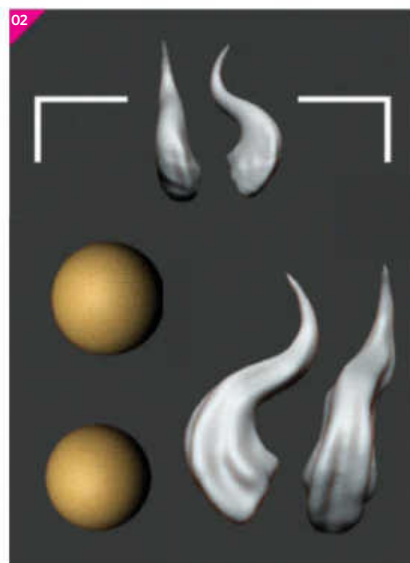
04 Clean up the topology At this stage we have to add some resolution to the model. From the SubTool panel, duplicate the SubTool of the horns. We can use the ZRemesher guide brush that allows us to choose the direction of topology, drawing alongside the horns the lines to give a direction. Now move to Geometry>ZRemesher>ZRemesher button. Then subdivide your geometry with the Divide button. Next, go to SubTool>Project>Project All to project all the sculpted details onto the new cleaned mesh. Remember to be on the cleaned SubTool while you're doing this operation, with the original SubTool turned on.

05 Push the realism Before we do anything else, we need to create a bone look. The main tool that we can use is the NoiseMaker to add a tileable noise to our horns. You can find it by going to Surface>LightBox>NoiseMakers. It will help us to improve the realism. If we use that with the Morph Target turned on, with the Morph brush we can decide afterwards where to put the noise or not. Also, by using the DamStandard brush and HPolish we can make some of the details that we made with NoiseMaker a bit stronger.

06 Include details and asymmetry Once we've finished the model, we need to add some asymmetry between the horns. It can just be a little variation on the silhouette and on the small details. Add scratches where you think they'd exist - for example, where the impact with another pair of horns could happen. For this part, turn Symmetry off and work wisely - too much detail might not be realistic, but not enough can be irrelevant, so find the happy medium. You can use the Standard brush with Alpha 58, for example, and with a low Z_Intensity dig some scratches along the model.

Pay attention when adding details

When we add the fine details, we have to be sensible. Using the Morph Target, on the menu MorphTarget>StoreMT, we can restore the previous surface to build in more variations along the horns. Bear in mind that when you start to sculpt details, you have to turn off the Symmetry so that you don't end up with a boring tile on the surface. This also applies when you're using the NoiseMaker plugin. There you can add an Alpha that you can create by yourself in Photoshop, or you can find one in the ZBrush Download Center.





Technique focus

Incredible 3D artists take us behind their artwork

DETAILING I started with a solid personal concept to create a 'realistic fantasy' character style. I focused my attention on details, and for this ZBrush gave me the scope to try new tools and techniques. When the blocking phase was finished, I started to retopologise. To define the material surface I used a custom Alpha and a lot of classical hand sculpts.



Diego Sain
www.iusalab.com

3DArtistOnline username
DiegoSain

Software Maya, ZBrush, KeyShot,
Marvelous Designer, Photoshop

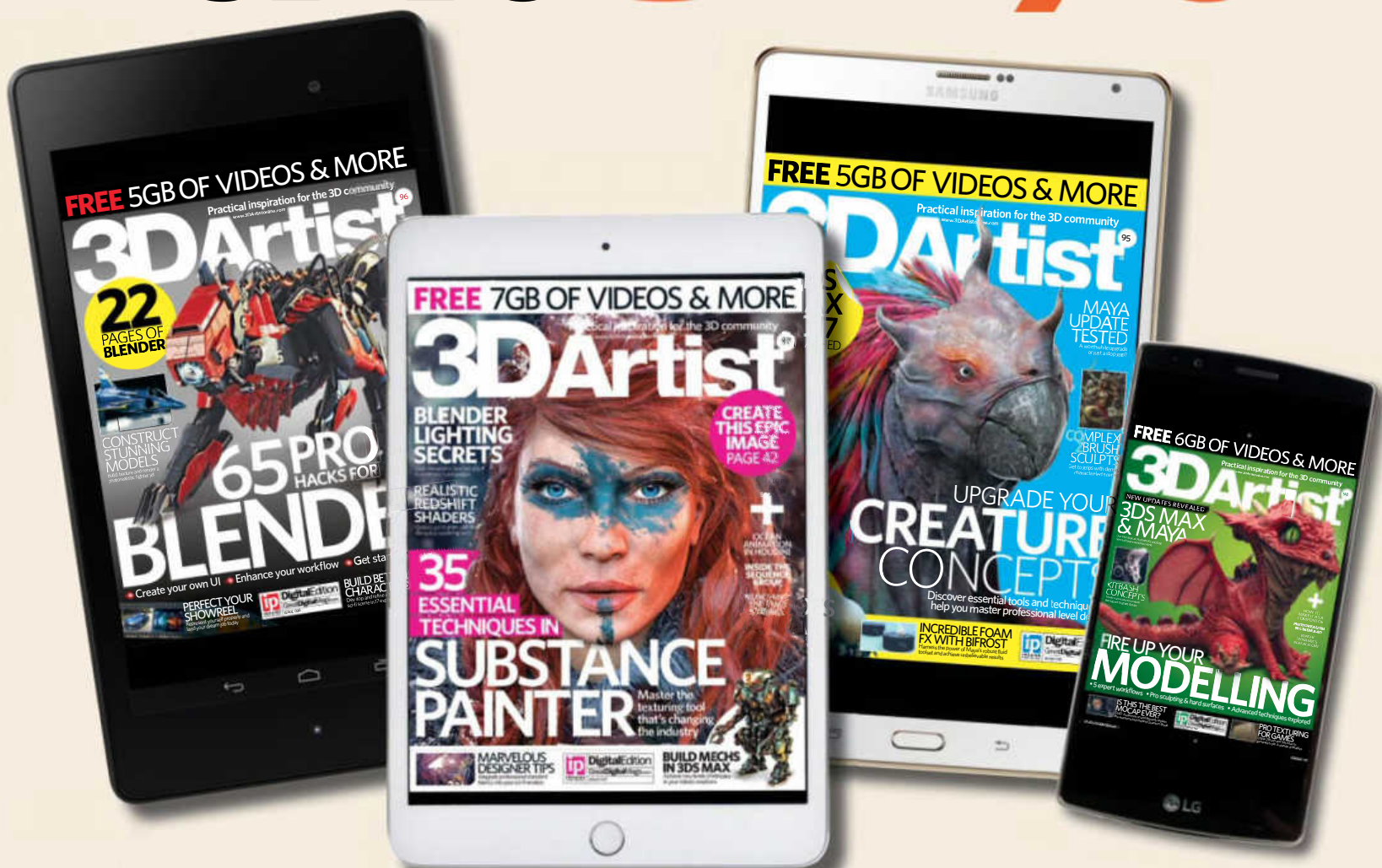
The Last King,
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Clarisse iFX 3.0

Is the latest version of Isotropix's tool worth the upgrade?

Within a professional production pipeline you'll usually find that a lot of complexity is involved in bringing CG assets from different departments into one major application for lighting and look development. It is obvious that such a software solution must be intricate to be able to handle all the data, but that's not quite the case when it comes to using Clarisse 3.0 as pipeline tool.

The new version of Clarisse has a completely new PBR shading system implemented, which gives CG artists plenty of flexibility when it comes to creating realistic renders – particularly when you bear in mind that most CG artists work directly on the final image itself, rather than the other way around.

The Global Project setup is easy to use. In Clarisse, you work with a folder structure that you'll recognise from normal operating systems. Surprisingly, in the newest version there is a feature where folders can be exported either as alembic scenes or a Clarisse project. The Clarisse project can be referenced back into the project and will be updated on the fly if a change to the corresponding scene is happening. Assets are referenced to alembic files. To create a material library on its own, the Material folder will be exported to a separate project. In this project the PBR material system comes into play.

It's easy to create a shader ball in a small test scene to see the materials in action before saving the project for an update in the master project. Subfolders hold geometry and lights. In version 3.0 of Clarisse, lights, materials and renderer are unmistakably separated. The lights and materials exist in special menus for PBR relevant objects called Physical. The PBR rendering engine is called Path Tracer. To create a render output, it's necessary to add an image object in a 3D layer.

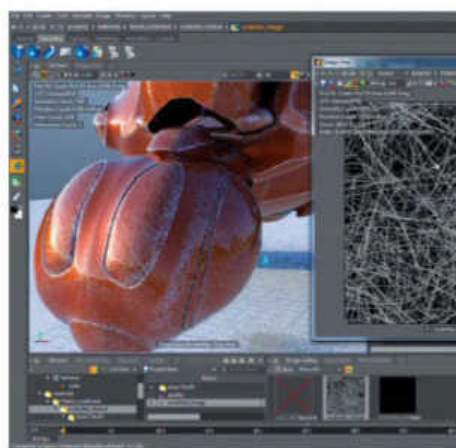
The Ladder includes the Path Tracer assignment including light and geometry linking based on groups. This guarantees flawless referencing in the master project.

It is fairly simple to create a small material library. For the white porcelain of our test scene, the yellow-ochre touch was made with a PBR layered material, which allows the layering of six different PBR materials. The key advantage of this material builder is the fact that you don't need high technical knowledge of materials, their behaviour, or how to work with energy conservation, as the weighting between all layers is done automatically; Clarisse will distribute the rays smartly between all layers. It was easy to use a PBR Diffuse material for the base colour, a first reflection layer with more Roughness and a second reflection layer as clear varnish. What's really important is how you can blend layers – not only via a simple overlay, but also with an IOR value, which is great for the reflection layers. For each material type that's necessary for the scene there is a special PBR material node available.

Another important element is the material assignment. Instead of dragging and dropping a material onto a mesh, Clarisse allows you to use Shading layers and wildcards. A Shading layer is an object that basically contains a set of rules. You can create a Shading layer from scratch or simply Ctrl/right-click on the image output. Here, it's also possible to create a Shading layer including already set relative names. CG artists can create several materials that will be listed, and for each material there is either a rule based on a special syntax or a wildcard. It's a tremendous workflow booster when working in decentralised teams where work is always changing during material creation and lighting the digital set.

Rainer Duda





Essential info

Price	Starting at £765 / \$999
Website	www.isotropix.com
OS	At least Windows Vista Business SP2, Linux RedHat / Centos 6, OS X Snow Leopard
RAM	Minimum 2GB, recommended 8GB
CPU	Quad Core i7/ AMD FX 4K+
HDD	SSD with minimum 500MB free space
GPU	OpenGL 3.0 compliant graphics card with at least 1GB memory

Summary

★★★★★	Features
★★★★★	Performance
★★★★★	Design
★★★★★	Value for money

Verdict ★★★★★

Clarisse 3.0 is definitely a great candidate for intuitive, high-quality look development workflows

MAIN The intuitive PBR Material assignment via wildcards based on Shading layers is an intense workflow booster when working in both small and large teams

FAR LEFT With Clarisse 3.0 you can jump into VR Look Development thanks to the newly implemented Panoramic Camera with various render settings

LEFT The new PBR material library smartly distributes samples even between layers to ensure the best render performance without impacting energy conservation

Fusion 8

Is this the best compositing software yet?

With the exception of Smoke, for the past 15 years I've been lucky enough to have the opportunity to use NUKE as well as After Effects throughout my work as a visual effects artist. I had never seriously considered Fusion, though.

Originally developed by eyeon Software, Fusion is a node-based compositing tool that has a lot of potential, but in the past I had always been rather discouraged from using it due to its previously high price along with the very few training resources I could find online for it to help me learn the package. To top it all off, it was only available for Windows users.

After the Blackmagic acquisition two years ago, though, things changed. Blackmagic made Fusion available to download for free and ported it to both Mac and Linux, so I decided that it would be worth giving it another chance.

As soon as you open Fusion, you can see that its node-based structure is a lot like what you would find in NUKE, and the presence of a true 3D environment means that you can easily create or import your own models, textures and lights into your composition, and even do some basic animation with them. This is a huge advantage because it means you can do some realistic shading, lighting and rendering using OpenGL directly within Fusion's internal engine, without the need for any external plugins.

As can be expected, there are a wide variety of professional compositing tools within Fusion for things like keying and 2D tracking, a built-in Vector Paint tool, spline-based key framing and scripting capabilities. My favorite aspect of Fusion, though, is that on top of all the compositing tools, it also has some pretty cool motion graphics and effects

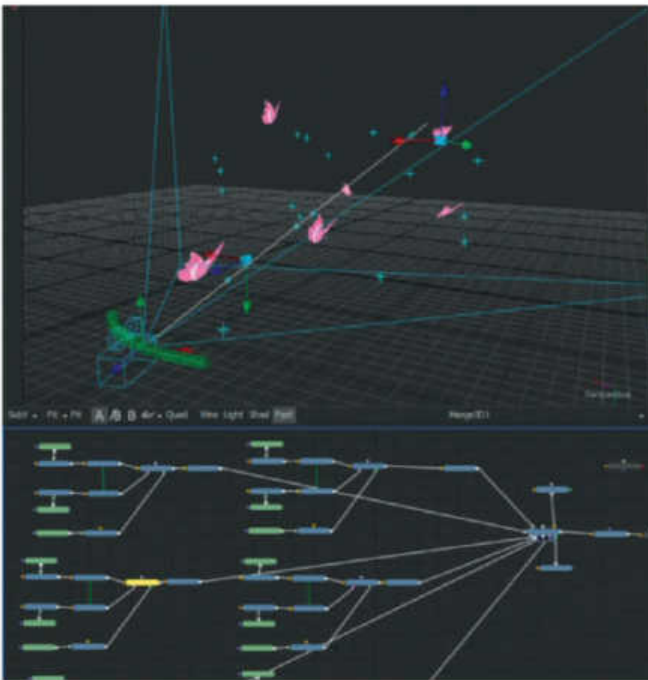
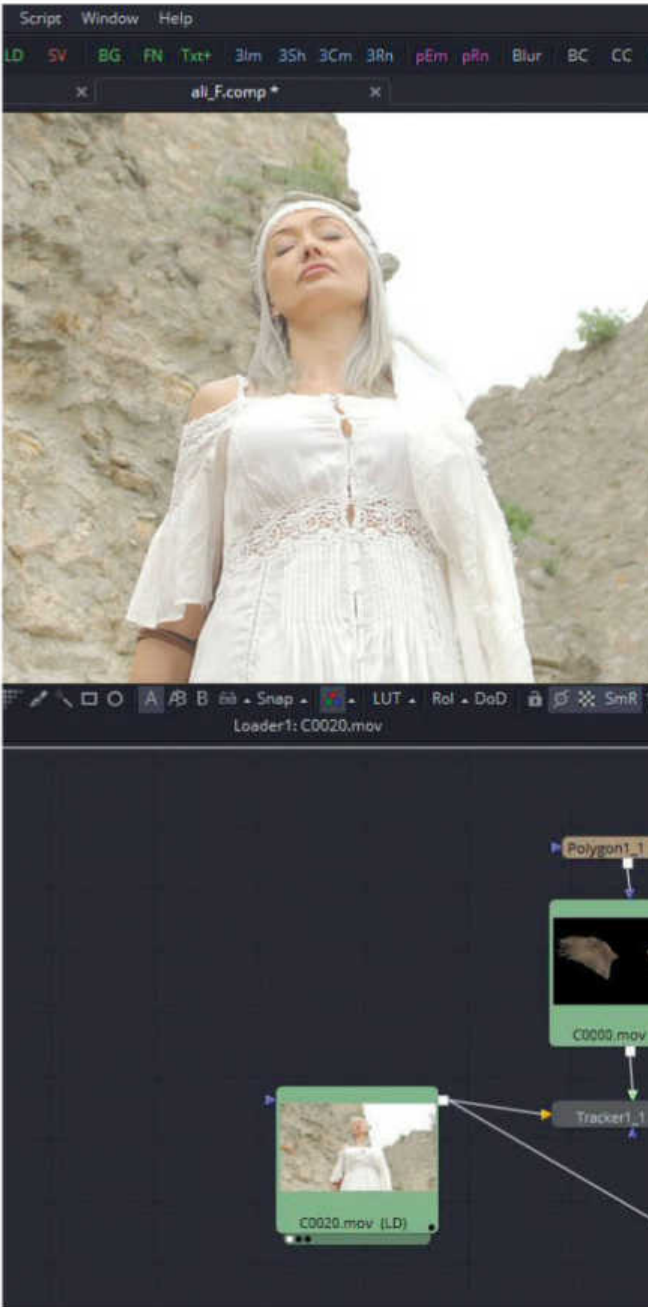
toolsets, like its very own fully fledged integrated particle system complete with forces like Avoidance and Bounce along with emitters, so you can create a variety of effects like snow, fog, or explosions without needing to create them within another FX package first.

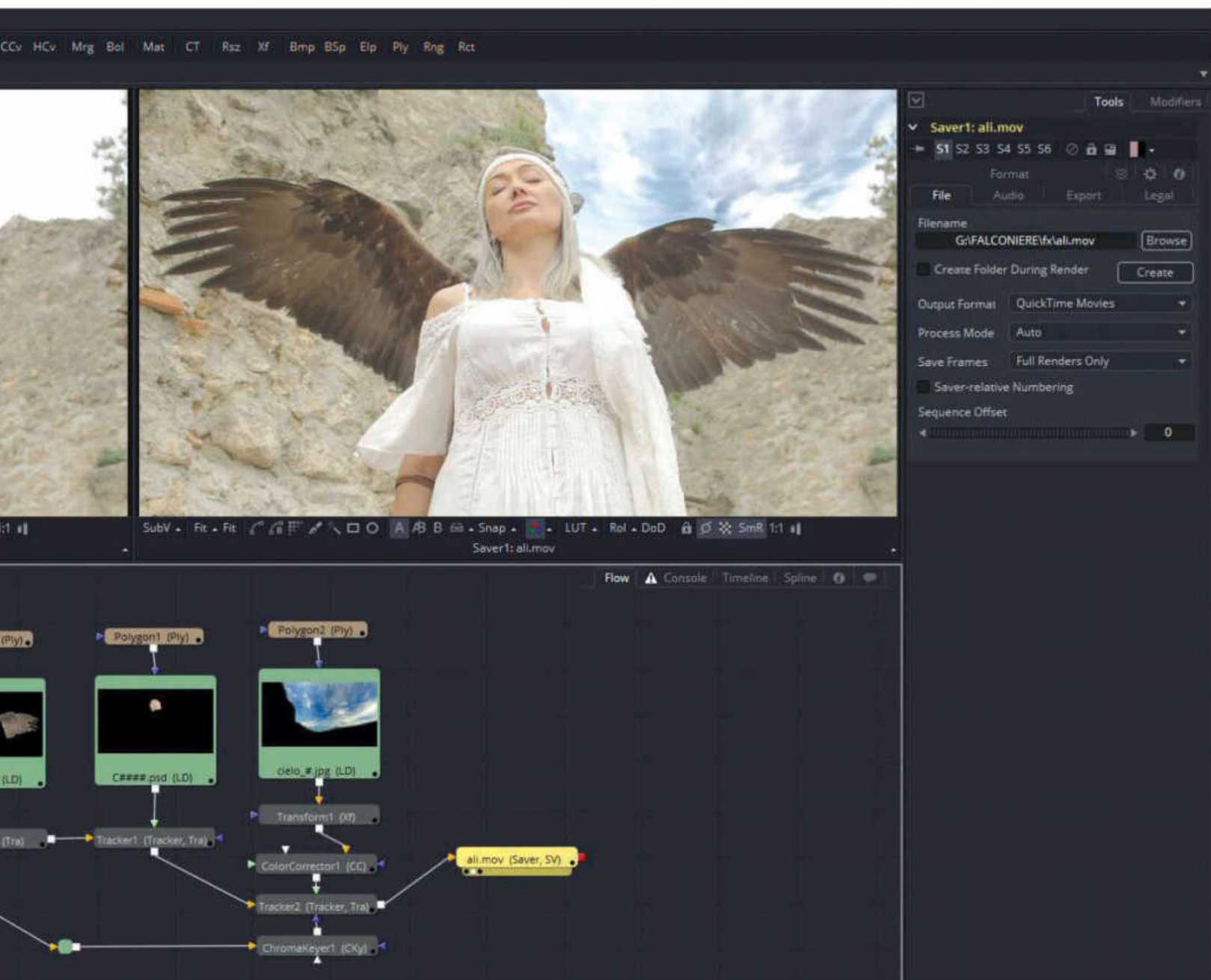
When it comes to Fusion's disadvantages, the biggest one I found is that 3D tracking is currently not available unless you delve into external software, so we'll have to wait until it is implemented in a future release. Another disadvantage is the fact that the free version of Fusion lacks some features, which Blackmagic has said are aimed at professional users, such as support for third-party plugins, optical flow image analysis for stereo 3D work and unlimited network rendering. To gain access to those, you'd have to buy the £735 Fusion Studio version of the software. This isn't too bad, though, as the free version of Blackmagic Fusion is a pretty complete piece of software and there aren't that many features missing at all when compared to the full Studio version.

Overall, I definitely think that Fusion has come a very long way over the past two years. It's the complete tool for advanced compositing work, and it's really easy to learn and start using – I've since switched over to it for all my professional compositing work.

Especially after considering the success Blackmagic Design made of Fusion's sister software, DaVinci Resolve – which is now constantly upgraded and has a huge amount of learning resources to its name online – it's safe to say that Fusion has an exciting future ahead. So what are you waiting for? Download it – it's free!

Ermanno Di Nicola





Essential info

Price	free or £735 / \$995 for Studio
Website	www.blackmagicdesign.com
OS	Mac OS X Yosemite, Windows 7 64-bit
RAM	8GB
CPU	Intel or AMD
GPU	2GB memory
HDD	1GB
Mouse	Three button

Summary

★★★★★	Features
★★★★★	Performance
★★★★★	Design
★★★★★	Value for money

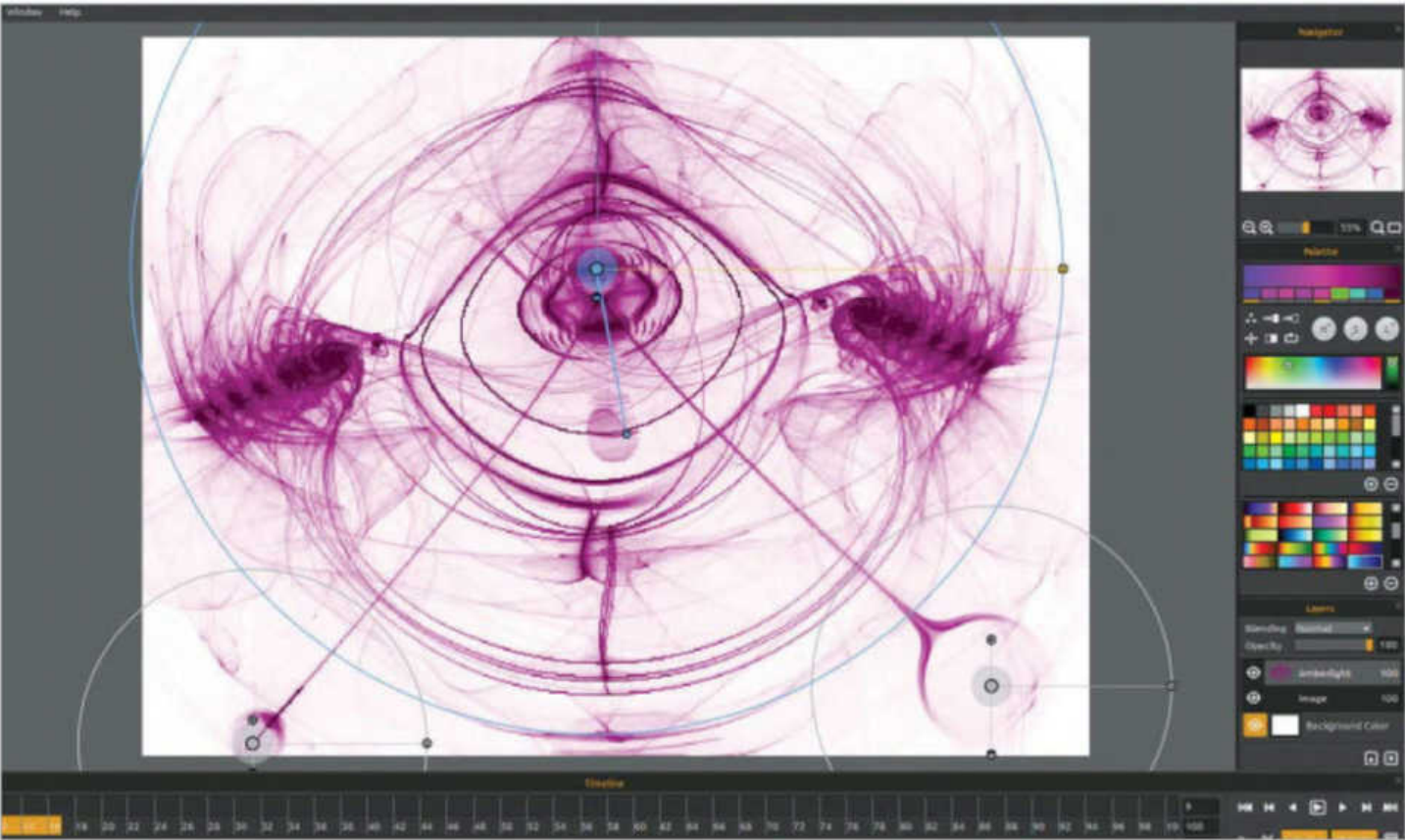
Verdict ★★★★★

A compositing and VFX desktop solution, also for advanced professional users, at a very cheap price

MAIN Blackmagic Design offers two different versions of Fusion: the free Fusion, which anyone can download from the Blackmagic website, and Fusion Studio for £735

FAR LEFT Because Fusion is node-based, you are able to quickly get a visual understanding of your compositing project and easily see all the various passes that have gone into the final comp

LEFT An Italian commercial made with Fusion 8 for immobiliare.it. Media agency: PicNic. Production agency: thebigmama.it



Amberlight 2

Escape Motions' update presents a unique and diverse tool with a low barrier of entry

At first glance, it's fairly hard to put a pin in what you can actually use Amberlight 2 for. This isn't necessarily a criticism; more a nod to the fact that it's hard to define the purpose of such a tool in a traditional way - you have to figure out what you want to use it for yourself. Abstract motion graphics, dynamic stills and psychedelic post-production effects are all fair game here, and the toolset is deep enough to engage, but easy to understand for users with even the most basic knowledge of creative software. It's all about accessibility here. As soon as you boot the program up, Amberlight generates a random simulated image, which you can then adjust to your heart's content. These simulations are generated from different Fields, which are neatly represented by modifiable circles in the viewport, and you can add or subtract Fields to create wildly different effects. It feels like the whole basis of Amberlight is centred around trial and error, which is as much one of its charms as it is a potential negative for artists looking to create structured, controlled effects. Fields can be easily adjusted in size and intensity using either the handles in the viewport or sliders and number fields in the adjustments toolbar.

Doing so changes the output of the simulation that chugs away in the background - this can be quite slow on older hardware, as Amberlight needs to re-render the whole frame even after the tiniest adjustment. Luckily, Raster settings allow you to preview your work at lower quality, which saves a lot of time. You can render your abstract creations out at a number of resolutions and in a number of different file types, including video formats if you fancy creating an animation. Amberlight comes with simple yet robust animation tools, with a clear timeline and the ability to keyframe. Essentially, Amberlight 2 is so unique that it becomes very hard to either recommend to you as a 3D artist, or talk about disparagingly. It does exactly what it says it can do - and if you're the sort of artist that really likes to experiment with unique tools then at this price there's no reason not to try Amberlight 2. For those of you that are production focused, the benefits might not be immediately clear. Still, we created some lovely work and enjoyed the trial and error aspect an awful lot. Amberlight itself feels like an experiment, making it the perfect tool to experiment with. **Steve Holmes**



TOP Fields are easily controlled and customised with the use of various handles, as well as traditional numerical parameters
ABOVE There's no limit to the amount of abstract stills and animations you can put together in Amberlight

Essential info

Price	\$60 US
Website	escapemotions.com/products/amberlight
OS	Windows XP+ / Mac OS X 10.6+
RAM	1GB minimum
GPU	OpenGL 2.0 compatible
HDD	40MB free space
Internet	Connection required for install

Summary

- ★★★★★ Features
- ★★★★★ Performance
- ★★★★★ Design
- ★★★★★ Value for money

Verdict ★★★★★

Well designed and endlessly creative, Amberlight 2 is a fun experimental tool that is well worth the asking price

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Technique focus

Incredible 3D artists take us behind their artwork

CONCEPT This started out when my daughter and her friend wanted to record a song, and I produced and recorded the track in my studio. This led them to wanting a video for it too. I modelled a scene to illustrate the song's theme: time. So this image is essentially a still from that resulting music video. The video itself is on YouTube – search 'Iralin'.



Thomas Feiner

www.feinerarts.com

Thomas started making 3D images in the early Nineties and has been freelancing ever since

Software ZBrush, 3ds Max, OctaneRender, Photoshop

IraClock,
2016



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The Hub

The inside guide to industry news,
VFX studios, expert opinions
and the 3D community



“Two BU graduates will present their work on two Academy Award-winning films – Star Wars: The Force Awakens and Ex Machina”

Sofronis Efstathiou,
BFX Festival director

088 Community News

Biggest ever BFX

BFX is back for its fourth year, with a whole host of talks, presentations, workshops and activities for all artists of any level

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The founder of YellowDog tells us how 3D inspired him to create a new rendering solution with green tech at its heart

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Readers' Gallery

The latest images created by the 3dartistonline.com community



Cinesite director Eamonn Butler and senior compositor Venetia Hadley will be speaking about the studio's recent work
© Twentieth Century Fox



Get Oscar-winning tips at BFX

Talks from ILM and Double Negative supervisors are just two events in the Festival schedule

Back again for its fourth year, BFX is set to be the biggest it's ever been thanks to four specially targeted programmes. From 8 to 16 October, BFX Pro, BFX Core, BFX Family Weekend and Workshops will all be held at the Bournemouth International Centre as part of this year's festival.

BFX Pro, in partnership with The Foundry, is back for its second year and will focus on the latest technical innovations. BFX Pro's theme for 2016 is 'Tomorrow's Innovation in the Creative Industries' and will include panels from MPC's Rob Pieke, who will discuss the 60-plus environments featured in *The Jungle Book*; Paul Doyle from Fabric Software Inc; a lunchtime showcase from Andy Lomas on 'Cellular Forms: adventures in morphogenesis and high dimensional parameter spaces' as well as a special showcase from The Chaos Group on prototyping new renderings and shader tools.

The four-day programme for BFX Core, meanwhile, will include plenty

of different events for students, professionals and hobbyists. The first day on Tuesday 11 October will have keynotes and presentations from the likes of Ian Livingstone, OBE; ILM on *Star Wars: The Force Awakens*; MPC on *The Jungle Book* and Paul Campion on funding a Kickstarter project. Later that evening, there will be a screening of *The Force Awakens* with Mike Mulholland, with the VFX supervisor on *The Force Awakens* doing a Q&A. Wednesday 12 October sees presentations from Cinesite on the making of *Independence Day: Resurgence*; Pixar on its use of RIS and USD in *Finding Dory*; Double Negative on rigging in *Ex Machina* and finally an evening screening and Q&A on *Ex Machina*.

Thursday 13 October will be videogames-orientated, with talks from Creative Assembly on *Total War: Warhammer*; Frontier discussing *Elite Dangerous*; Foundry 42/Cloud Imperium Games on the use of mocap in *Star Citizen* and Playground Games on the making of *Forza Horizon 3*. Chaos Group and SideFX will also both be holding presentations and

"I'm looking forward to seeing the return of two Bournemouth University graduates, who will present their work on two Academy Award-winning films"

Sofronis Efstathiou,
BFX Competition and
Festival director

discussions in separate suites, with top tips and tricks and developers and trainers present for one-to-ones too. The evening rounds out with the BFX Competition Awards evening, sponsored by Kingston Smith. A careers hub will take place all day on Friday 14 October, which will be a great chance for aspiring artists to network with the industry. Also taking place on Friday is an Animated Women panel titled 'Being yourself - Gender Issues in the Animation/VFX Industries'. Finally, the BFX Festival Pitch Event will be a chance for a creative or digital idea to start becoming reality, with real advice provided by business mentors from Silicon South and other industry experts.

"I'm looking forward to seeing the return of two Bournemouth University graduates, who will present their work on two Academy Award-winning films - *Star Wars: The Force Awakens* and *Ex Machina*," says Sofronis Efstathiou, BFX Competition and Festival director, when we ask him what he's looking forward to the most at BFX. "Mike Mulholland (ILM London) and Mark Ardington (Double Negative) both studied at the NCCA, supervising on two of my favourite films from last year - so it has double the significance," he laughs.

For Saturday 15 October and Sunday 16 October, the BFX Family Weekend will play host to an exhibition from The Centre for Computing History, ZBrush classes recommended for ages 14 and over and activities including 3D printing and code club with TechAgeKids. All of these events are drop-in, but Sunday will see a special ticketed class on 'An Introduction to Character Movement for Children & Young Adults' by Sarah Perry.

Workshops will be taking place at Arts University Bournemouth (AUB) and at the Bournemouth International Centre. 'Martial the art of VFX' will be held as three workshops at the Arts University Bournemouth on 8 and 9 October, where attendees will learn how to draw, shoot and composite a VFX scene. 'Martial the art of VFX' will cost £75 for all three workshops.

A standard BFX Pro pass is £65, whereas a standard four-day pass for BFX Core is £140. You can get tickets now from www.bfxfestival.com.



Tony Wills will explain how Foundry 42 used 3D scanning and Agisoft Photoscan for *Star Citizen*



Alex Lashko



Mark Florquin



Mark Florquin

Animal VR winners revealed

We spoke to the winners of CGTrader's latest contest

CGTrader has announced the victors of its Animal VR challenge: Alex Lashko for his bull terrier model and Mark Florquin for his submitted animal portfolio. Here they give readers tips for winning VR challenges.

"From a very small age, I was very fond of dogs and always wanted to have one as a companion," begins Alex Lashko, on why he likes to model dogs. "From my perspective, owning a dog, however, takes a lot of responsibilities and restrictions in person's life. So making 3D dog models is as close as I can get to having a real one. Especially now you can look at it in VR, which brings it even closer to a lifelike experience. I don't think that modelling for VR is any different than modelling for any other real-time purposes, whether it is a

videogame or visualisation. The product must look good from all angles, so there is no room for cutting corners."

Mark Florquin, who won the Portfolio category, had this advice for working with photogrammetry in VR: "Making photogrammetry work in VR is really easy. You just decimate scan data, pop it into a game engine and voila - your digital experience is ready. I, however, am a perfectionist. I like clean meshes and UV maps, so I will spend a lot of time in ZBrush before publishing. My process is to convert scan data to low-poly models first, and then bake the details to maps. In VR, interaction and motion is really important, so rigging your models is really valuable."

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New ZBrush product for easy 3D learning

Pixologic's latest release is simplified for newcomers

Revealed at ZBrush Summit 2016, ZBrushCore is set to streamline the process of learning 3D, sculpting and ZBrush.

ZBrushCore can be used by all artists, but is a great fit for students, those that are new to 3D, illustrators, board game creators, comic book artists, designers, toy artisans, jewellers and 3D printing enthusiasts as it's been especially designed to be an

The ZBrush tech that's tucked away in ZBrushCore

Many of the signature features of ZBrush can also be found inside of ZBrushCore, including DynaMesh, the powerful subdivision sculpting engine, a set of sculpting brushes and the ZSphere system for building posable armatures. This means that all artists will be able to enjoy Core, and not just beginners to 3D.

easier tool for beginners and those who are not ZBrush aficionados.

Some of the same features in ZBrushCore can be found in ZBrush, too, as it has been built on the foundations of its sister software. Ready-made shapes and templates will also be available to help artists get straight into sketching, refining and painting a model. The finished model can then be rendered in ZBrushCore itself, or sent to another application for rendering if necessary. This means that it will be an easy process for any artists hoping to make the jump from Core to the full version of ZBrush in the future.

Whilst pricing was not available at time of print, Wacom's Intuos 3D tablet is the first piece of hardware to be bundled with ZBrushCore. Created in collaboration with Shapeways, Sketchfab and Pixologic, the Intuos 3D tablet will retail at \$200. In comparison, ZBrush is \$800 for a single licence.

Much like ZBrush, ZBrushCore will be available for Windows and Mac OS X.

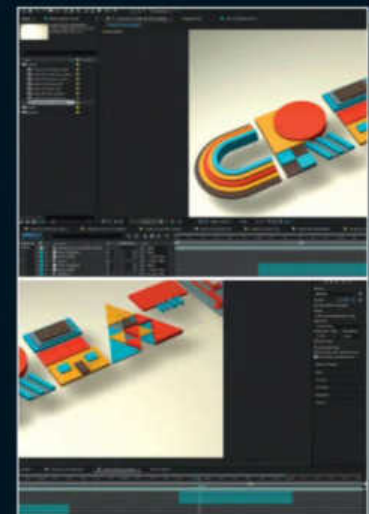
After Effects CC gets a C4D renderer

The post-production tool gets plenty of VFX features and brand-new Cinerender

Adobe has announced at IBC 2016 that the next version of After Effects CC will have Cinema 4D's standard render engine integrated into the software. MAXON, the creator of Cinema 4D, has also been working with Adobe to make 3D CPU rendering in After Effects even more efficient with the integration of its brand-new Cinerender technology. This means that 3D elements, such as text and shape layers, can now be edited intuitively inside of After Effects CC.

Playback performance for real-time VFX footage in After Effects has also been improved, removing the need to cache footage first before previewing with GPU-accelerated effects for quicker compositions.

Elsewhere, Adobe's mocap tool Character Animator is getting better linked functionality between Photoshop CC and Illustrator CC, and Premiere Pro CC will get auto-aware VR changing to switch settings based on if media is monoscopic or stereoscopic.



Adobe After Effects is getting Cinerender to bolster its rendering options

HAVE YOU HEARD? Double Negative is setting up an LA office for DNegTV for the first time, to be headed up by Andy Williams



Lucasfilm's secret weapon: a new open source standard

MaterialX is set to improve efficiency of look dev between studios and software packages

A new open-source material standard called MaterialX is being developed by Lucasfilm, in partnership with The Foundry and Autodesk. Its aim is to bridge the gap in look development between various content creation tools.

Doug Smythe, who is heading up the development of MaterialX, came up with the idea while working on the first *Iron Man* movie with other studios. "The studios really had to do a lot of work to try and match our look, and they were never able to get 100 per cent there for many reasons - not the least of which time. But it sort of underscored the need that this was going to come up more and more often, and it's hard work to do."

Smythe is hoping to release the open-source codebase later this year. "We want to make it as universally accepted a standard as possible. By having things open source, I think it makes it easier for other studios to adopt."

Pixar's USD also went open source this year, and Smythe reveals, "we are very much in conversation with the USD team and there is belief on both sides that we can come to some kind of merge or supporting of each other."

MaterialX has already been used on *Star Wars: The Force Awakens* and will be used on *Rogue One*, too. "It's become part of our standard workflow and we're seeing a lot of efficiency gains because the look dev work can be done in one place by one artist, but we can continue to evolve that look in our native lighting package KATANA if we need to."

Max to Maya plugin released

The new tool is intended to make transfers easier between the two Autodesk products

After creating the 3ds Max to Cinema 4D plugin, Marcelo Luis Bruno has turned his hand to make scene transitions from 3ds Max to Maya easier. This plugin is perfect for those who have models in a MAX format, and want to quickly add them to a Maya project, or want to improve their 3ds Max project with Maya features. Max to Maya has V-Ray support to enable automatic conversion of lights, materials and settings. For similar materials and settings, the plugin will look for the closest equivalents, saving time in adjustments and tweaks. You'll also be able to quickly create Maya libraries from 3ds Max models, or rig models in 3ds Max for animating in Maya. Max to Maya is \$49 and is available at www.maxtomaya.com.



The Max to Maya plugin lets you transfer scenes in just two clicks

Software shorts

Bringing you the lowdown on product updates and launches



Asset Management 2.0

Blender add-on Asset Management 2.0 now has a useful window that holds tabs for Assets, Scenes, Materials and HDRIs. It also keeps the last preview of the material you used, even after shutting down Blender. The Replace Assets option can also link objects together, and assets can be edited in a scene immediately.



Krakatoa 2.6 for 3ds Max and Maya

The volumetric particle renderer now supports depth of field, anamorphic squeeze and bokeh in version 2.6 for Max and Maya. A new Adaptive Motion Blur option improves animation rendering too. 3ds Max gets version 2.6.1 with a new World Space Modifier for the Delete and PR Cloner tools.



Mocha Pro 5 OFX

Imagineer Systems has released version 5 of the planar tracking plugin for Nuke and Fusion. Mocha Pro 5 OFX now has GPU-powered acceleration, plus a more efficient workflow by supporting any format that the host software supports. Mocha files can also now be shared across platforms, and not just available in the host project files.

DID YOU KNOW? Boris FX is merging with GenArts and is adding to its post-production tool portfolio by acquiring Sapphire



Website www.wetafx.co.nz

Location New Zealand

Project Pete's Dragon

Project description Designing and rendering a lead, digitally animated character and augmenting live-action plate photography with CG elements

Studio Weta Digital

Company bio Established by Peter Jackson, Jamie Selkirk and Richard Taylor in 1993 to produce visual effects and characters for their movies, Weta is now globally recognised. Credits include the double trilogies of *The Lord Of The Rings* and *The Hobbit*, *The BFG*, *Deadpool* and *The Adventures Of Tintin*

Contributors Eric Saindon, VFX supervisor

Pete's Dragon

Visual effects giant, Weta Digital, reimagines an old-school Disney classic for a new generation

Dragons and movies have traditionally worked pretty well together, and *Pete's Dragon* proves the case. Following the release of Disney's latest picture, we were lucky enough to have a chat with Eric Saindon, visual effects supervisor at Weta Digital in New Zealand, about the complexity of the project and his team's dedicated work on the film. Over a six-month period, Weta Digital worked on over 700 shots for the movie, which revisits the original *Pete's Dragon* cartoon animation from way back in 1977, but with a much more modern approach.

Saindon begins by explaining that a key challenge was always in "getting the emotion in a CG dragon, to make a dragon interact with Peter in such a way that you feel for him. [Director] David Lowery wanted this dragon to do what a kid would draw a dragon to be. This is not Smaug, this is not *Game Of Thrones*."

Of Weta's initial conceptual design work for the big green beast, Saindon recalls, "Early on, David gave us some sketches and we built a first version of that. We found lots of photos of happy and sad animals and we took our dragon to match those poses in order to get happy dragon pose. The original design had ears on top of Elliot's head, but that didn't work [as well as hoped], so we made them bigger and more like those of a Labrador."

As part of the ambition to make Elliot thoroughly believable in both appearance and behaviour, Weta Digital committed to rendering a stunning level of detail, proving the theory that it's the subtle stuff that's usually hardest to accomplish. Elliot is an incredibly furry dragon, and Saindon explains, "The dragon had 20 million individual hairs and they were all simmed individually. You can see the fur interacting with hands. It's a subtle use of CG."

Beyond its focus on creating Elliot, Weta also contributed a number of other visual effects. Saindon continues, "The third act has the big CG scene when the dragon gets angry. We see the huge VFX element." He also notes that much of Weta's non-Elliot work was focused on creating "a lot of 3D enhancements, [which includes] adding trees and extending forests." Matte paintings and very subtly animated work on digitally created foliage enhanced the specific story needs of the wilderness setting.

Of his team's efforts to conceptualise how Elliot would look and act, Saindon explains that the cel-animated classics *The Jungle Book* and *The Lion King* were useful frames of reference. "We used the 1977 film's Elliot's mannerisms. We also tried to incorporate and to take mannerisms from Baloo or Scar [his lower jaw] and lots of clips of animals doing silly things. When Elliot and Peter are playing in the river, we referenced a fox jumping in the air and smashing down into the snow. Most of Elliot's movement came from some reference."

Finally, Saindon addresses what he considers the most complex and challenging sequence in the film: "There is a great scene in Elliot's cave at bedtime; it's just five or six shots of them looking back and forth that then really ties together what the movie was all about."



"We didn't use mo-cap at all. It didn't make any sense to mo-cap anything"

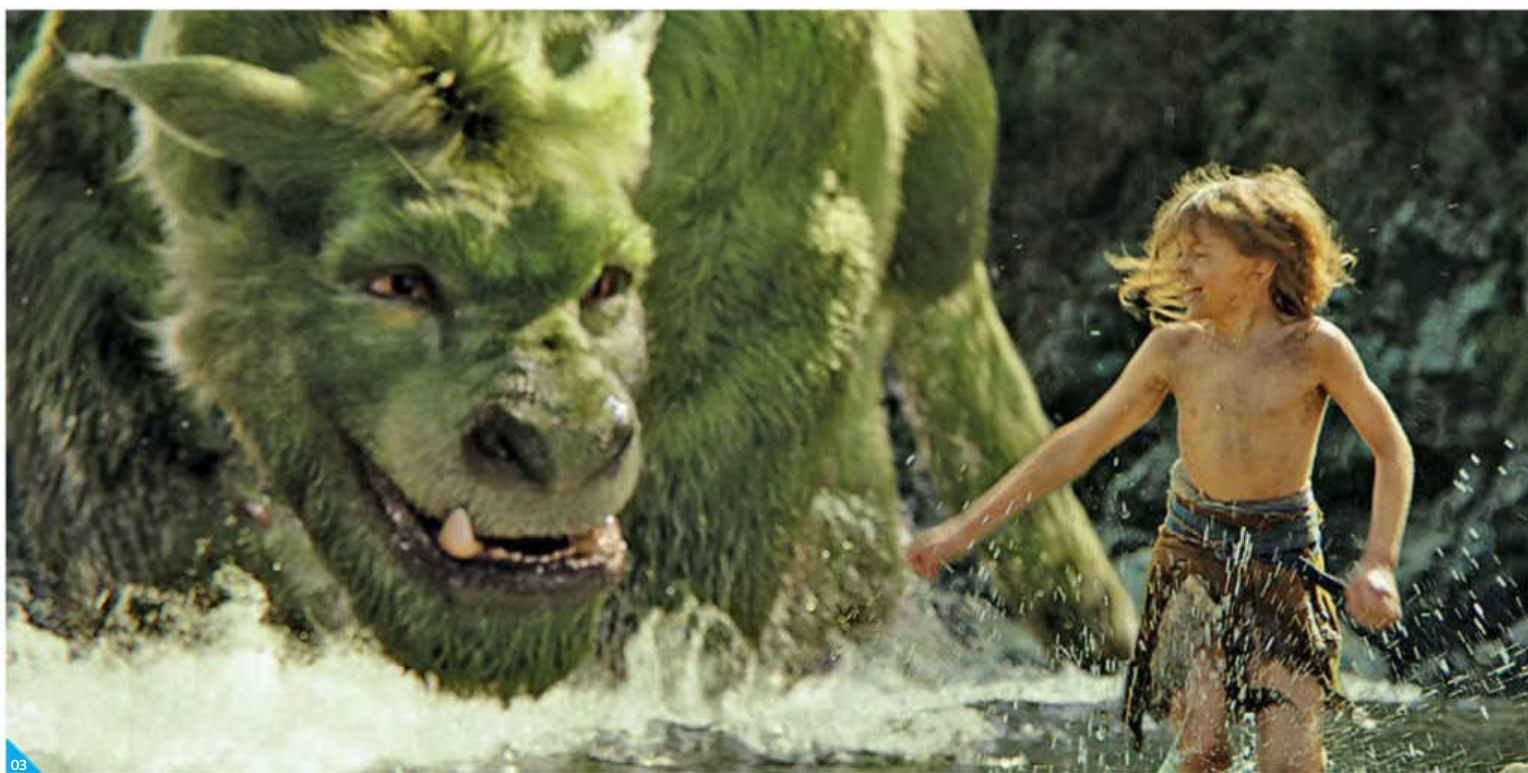
Eric Saindon, VFX supervisor

All images © Disney

THE ANIMATED HEART AND SOUL OF THE BEAST

Eric Saindon recalls his first response to Weta being awarded the project and the decision to forego mocap

"To be honest, my first thought was 'Oh, gosh, not another dragon movie,'" laughs Eric Saindon. "And then I got to read the script. It's a dragon movie by name, but it's a piece about two best friends, and the fact that we got to work on a Disney film just sent it over the top." Critically, and perhaps surprisingly, as it had been a key approach for Weta's creation of Smaug in *The Hobbit*, the production elected not to use mo-cap in the creation of Elliot. "We didn't use mo-cap at all. It didn't make any sense to mo-cap anything."



01 *Pete's Dragon* is a modern reimagining of the 1977 cartoon animation of the same name

02 Elliot's behaviour was informed by natural history documentary film reference

03 Scar from *The Lion King* informed the design of Elliot's jawline

04 Weta focused on the subtleties of a CG character interacting with a live-action performer

05 Weta simulated 20 million individual hairs to get the right look for Elliot





Job title Founder and MD
Location Bristol
Education Information Systems Engineering, MA, University of Durham
Website www.yellowdog.co
Biography After studying engineering at university, Gareth Williams worked in the mobile industry - initially for Orange in Bristol. He then moved on to the data sector and worked Arieso before starting up YellowDog in January 2015, a cloud rendering solution for 3D artists. His expertise is in product management.

Gareth Williams

The founder of the new rendering solution tells us why he jumped ship from IT engineering into CG

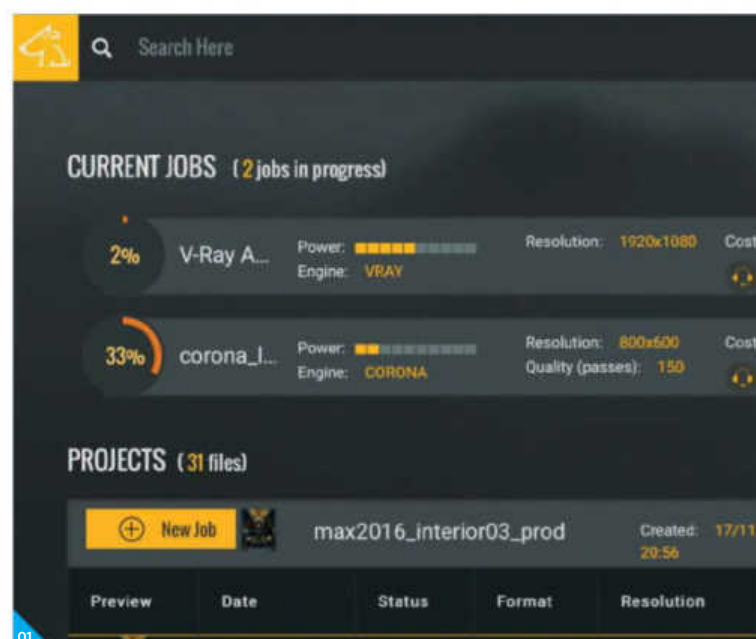
Gareth Williams' admiration for 3D artists is clear. He speaks about them with such high regard that it seemed almost natural to see him starting a technical solution to ease their rendering woes. "My area of expertise has always been in product management. It's always been about technological solutions," says Williams. "Before I started YellowDog, I did a ton of research in Bristol, talking to animation studios and 3D artists around here and they were really lovely... The talent that our customers have made me really want to help. So that's how YellowDog came to be."

YellowDog is a cloud rendering solution launched in November 2015, and Williams is appreciative of the assistance he's gotten in developing the startup. He cites being accepted into the SetSquared startup incubator in Bristol as a tremendous help: "It's a safe place to start our business. They've got a whole bunch of mentors, entrepreneurs and residents - they do events, so fundraising workshops and other things... It's where we have our office and it's good because there are a bunch of other businesses and entrepreneurs here to have a beer with at the end of the day for when something's gone well and we can celebrate, and when something hasn't to cry into your beer," he laughs.

We're not just talking a run-of-the-mill cloud render farm here, though. Williams prides his company on ease of use and he's focused on making rendering more efficient and straightforward for artists. It's this kind of mindset that has led him to the idea of crowdsourcing compute power for rendering solutions. "I was thinking about my computer and my phone - I plug my phone in every day and it is often underused. [I thought] 'is there a way that potentially I could build a service that could help people get some money for their phone or their computer when it's idle'? It caused me to come across the 3D rendering market, and how people's demands for computer power is going."

The concept of crowdsource rendering by using other studios' compute power in exchange for money is a much smaller solution than the vast seas of pre-existing data centres. It's interesting, then, that power output hasn't been compromised in favour of being environmentally friendly. "Simon, our CTO, his background is very much in green IT," explains Williams. "The work that he's done has shown that when we do crowdsource our power, because we're increasing the compute stock, our solution uses less carbon than other data centre based solutions where you had to buy new computers, alongside air con and electricity overheads."

These aren't miniscule amounts of carbon emissions either; the numbers mount up. Williams explains, "Our numbers are around 57 per cent less carbon emitted for the equivalent amount of compute. I think right now there are some stats that show that the amount of carbon emitted by compute or data centres is getting closer to [the amount emitted by] the airline industry, so it's pretty significant."

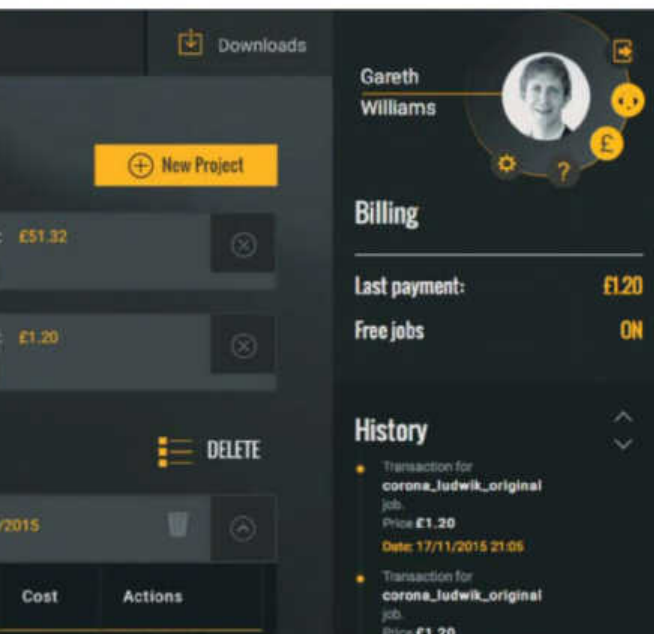


THE MATHS BEHIND THE COMPUTING

Gareth Williams on working with the brains at Tsing Hua University

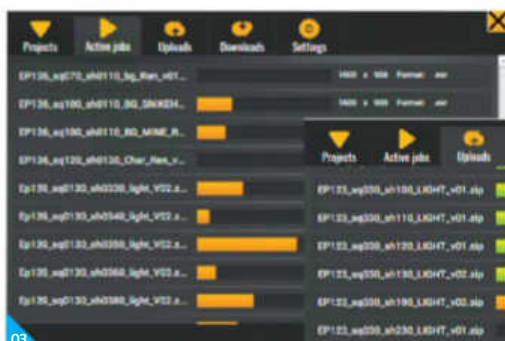
Some of the leading mathematicians in the world from Tsing Hua University in Taiwan are currently working with YellowDog to create groundbreaking calculations. "So we got some algorithms within our platforms," explains Williams. "Some that are for how we calculate the fixed price, and in the future will be for how we accurately tell people when their renders are going to be ready, which is really hard to do!"

Williams is understandably excited with the prospect of eventually working on papers down the line with Tsing Hua and revealing parts of these calculations to the world of 3D.



“The creativity and the talent that our customers have to create this stuff made me really want to help”

Gareth Williams,
MD, YellowDog



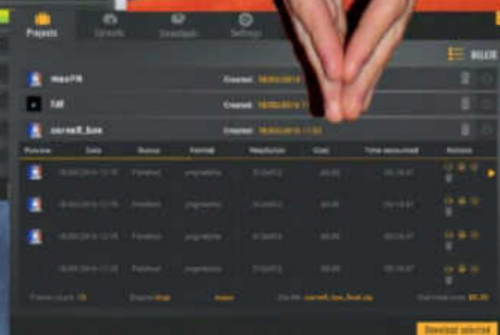
01 YellowDog has access to 96,000 cores, and so is one of the most scalable solutions on the market

02 Based in Bristol, YellowDog is one of the many companies housed within the Engine Shed building

03 YellowDog Zync compresses all of the content and then sends it to YellowDog



04 Williams had “a stretch target” to do something at SIGGRAPH 2016, “But we just weren’t ready so hopefully we’ll do something next year”



Images of the month

These are the 3D projects that have been awarded 'Image of the week' on 3DArtistOnline.com in the last month



01 Skate Workshop
by **Timothée Maron**
3DA username
TimotheeM

Timothée Maron says: "This work is a school project I made during my first year. The instruction was 'still life, free subject', so I decided to try to represent the manufacturing of a skateboard."

We say: What's immediately striking about this image is the superb lighting on show, but as you delve deeper, the finer details – like the dust and wood shavings – become more apparent.



02 Fractal Face
by **Heribert Raab**
3DA username
schwungsau
Heribert Raab says:

"This is an experiment to remesh a human face with different fractal methods – in this case I used a flowfield. For the final rendering, I used Growing Splines driven by the flowfield. The best thing about this method is that it's fully animated!"

We say: This is the sort of project that represents art meeting science, which is true for a lot of 3D scenes. Heribert has used his strong technical understanding of fractals to create a mysterious image.



03 The Harvest
by **Jarlan Perez**
3DA username
JarlanPerez
Jarlan Perez says:

"Today is one of the most important days of the year for an interplanetary farmer. And this farmer, well, he's not taking any chances."

We say: Strong, clear lines and bright, bold colours make this mech really stand out from other similar designs, and we love the little backstory that Jarlan has created around this well thought-out scene.

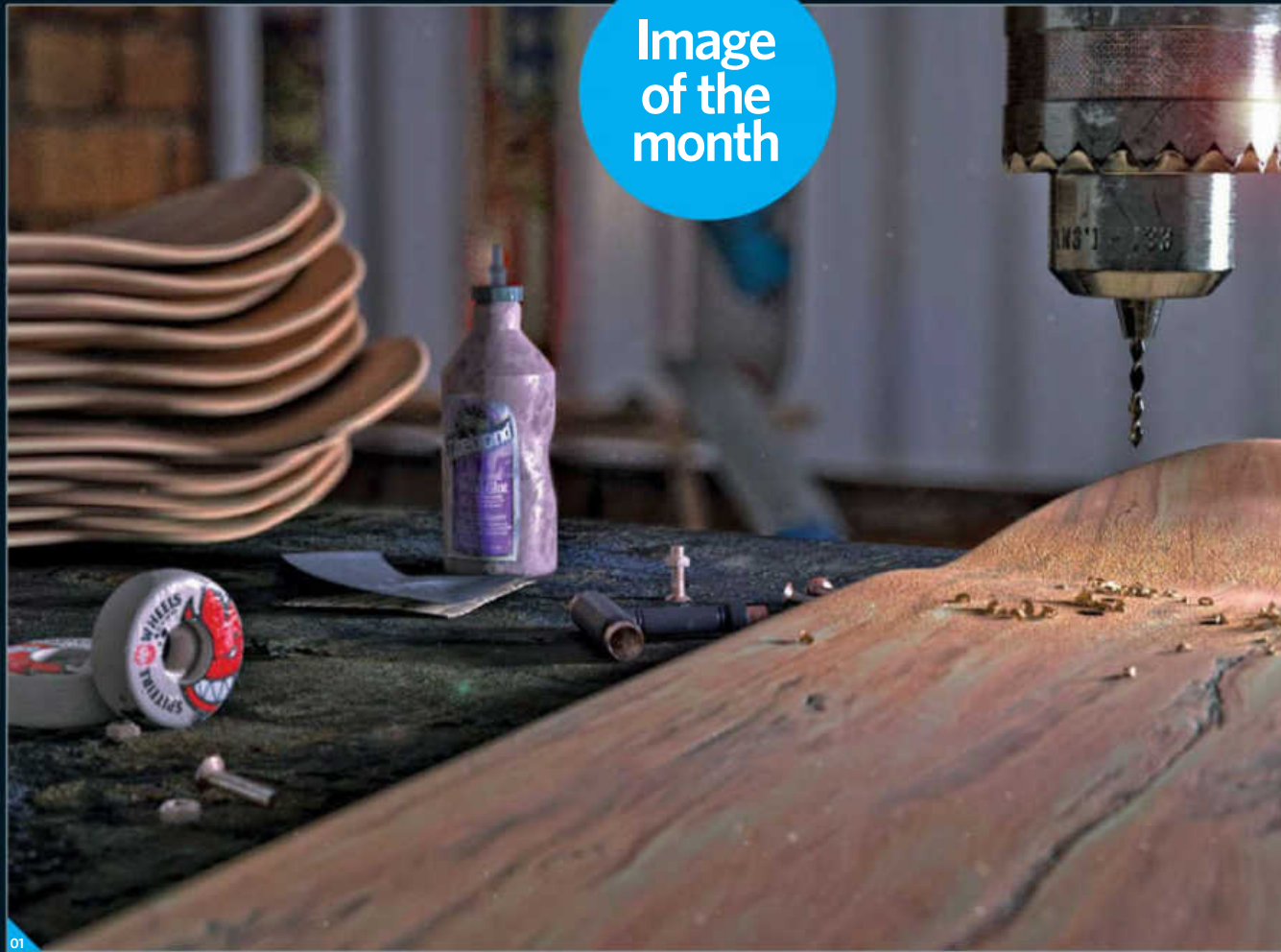


04 Old Street
by **Cihan Özkan**
3DA username
cihan_ozkan
Cihan Özkan says:

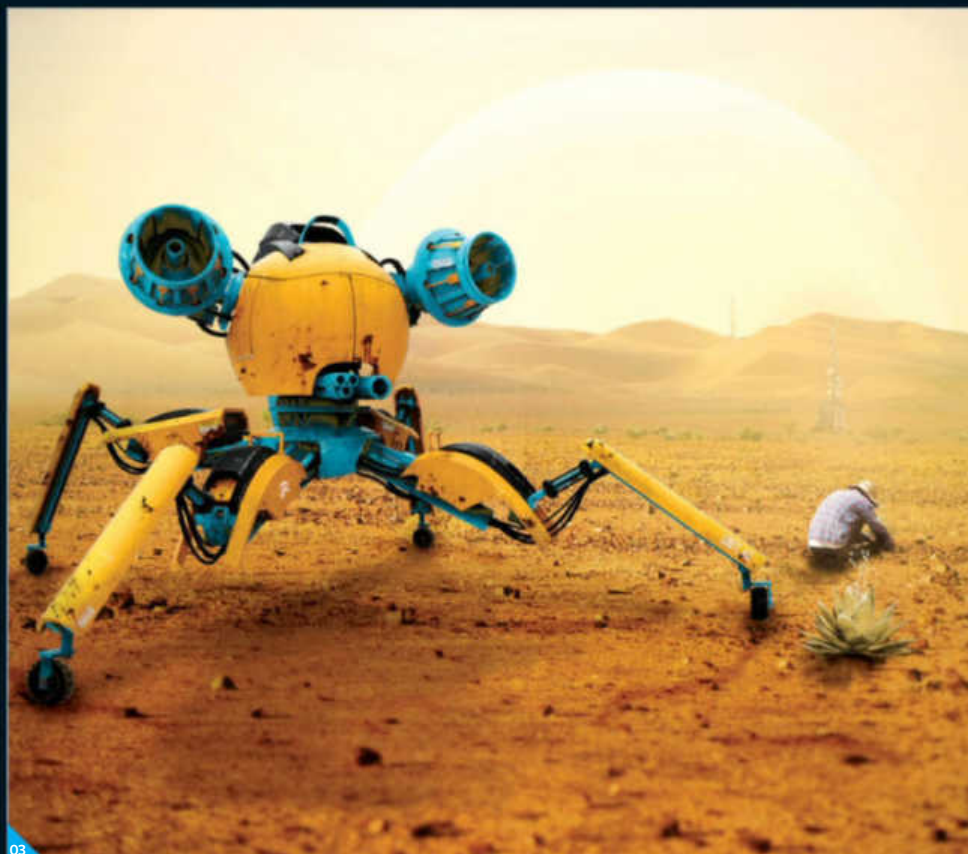
"If you want to create a beautiful image, you really need to pay attention to the small objects in the scene. These potted flowers and other similar details are the perfect example [of that]."

We say: Cihan is right – the devil really is in the detail. We love the ivy that's creeping up the side of the main building in this scene, and the balance of colours adds a lot.

Image
of the
month



01



03





02



04



Lamborghini by **Hamid Reza Nahavandi**
3DA username **NHRA**

Hamid Reza Nahavandi says: "I'm interested in cars and I love to render cars in CG. In this scene I used IBL and HDRI for lighting, and I tried to match the sense of space to the car model."

We say: A decent composition and mysterious lighting really elevate this vehicle scene from Hamid. We really like the accuracy of the reflections bouncing up off of the chassis.



The Nameless Queen's Demise by **Travis Davids**
3DA username **Travis Davids**

Travis Davids says: "A medieval sword buried in the sand, showing the demise of the nameless queen. The sword was created in Fusion 360 and rendered in OctaneRender."

We say: We love the way the strong lines of the sword model offset the muddy ground in this image. Most of all, though, we're really impressed with the composition and the camera effects Travis has gotten out of Octane.



Dilophosaurus by **François Boquet**
3DA username **Zackb**

François Boquet says: "I find the concepts of Alberto Camara fantastic, so I wanted to sculpt one of his concept pieces as an exercise. It was fun!"

We say: This is a wonderful adaptation of a truly great concept that is full of both life and character. There's a real classic Disney feel to this that resonates with us. Nice job, François!



Technique focus

Incredible 3D artists take us behind their artwork

HAIR CREATION ZBrush helped me build up everything I wanted in the modelling process, but when dealing with the hair, I used FiberMesh to develop the hairstyles. Then, I imported all the materials into Maya and used nHair to enhance the details and styles. After all of this was done, I imported all the materials into KeyShot to render the textures and lighting.



Pizza Chen

artstation.com/artist/pizzasso

Pizza enjoys creating charming, adorable, funny human beings, animals and little monsters

Software ZBrush, KeyShot, Maya, Photoshop

The Raging Bull,
2016

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